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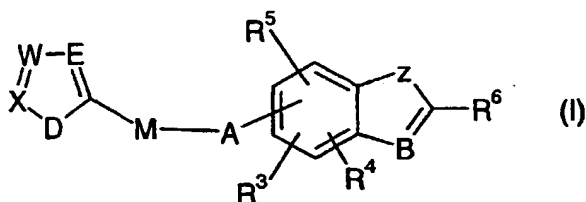
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(54) Title: BENZOXAZOLE DERIVATIVES AND THEIR USE AS PESTICIDES

WO 01/55136 A1



than 3 heteroatoms; M is N(R⁵¹)C(=Y), N=C(OR⁵²), N=C(SR⁵³) or N=C(NR⁵⁴R⁵⁵) where N is the atom of attachment to the group "A"; Y is O, S or NR¹³; Z is O, S or NR¹⁴; and A and the various R groups are defined organic radicals; their preparation and use and compositions containing them.

(57) Abstract: A compound of formula (I) wherein B is N, N-oxide or CR¹⁸; D is O, S, NR⁷, CR⁸=CR⁹, CR⁸=N, N=CR⁹, CR⁸=N(O) or N(O)=CR⁹; E is N, N-oxide or CR¹²; W is CR¹ or N; X is N, N-oxide or CR¹¹ and R¹¹ is hydrogen, optionally substituted C₁₋₆ alkyl or optionally substituted phenyl, with the proviso that the ring containing D, E, X and W contains at least one atom that is other than a carbon atom and the ring containing D, E, W and X may contain no more



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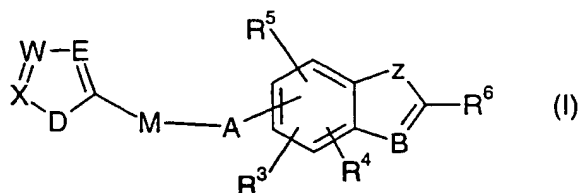
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BENZOXAZOLE DERIVATIVES AND THEIR USE AS PESTICIDES

The present invention relates to azole and azine derivatives, to processes for preparing them, to fungicidal, insecticidal, acaricidal, molluscicidal and nematocidal compositions comprising them, to methods of using them to combat fungal diseases (especially fungal diseases of plants) and to methods of using them to combat and control insect, acarine, mollusc and nematode pests.

Azole and azine derivatives are disclosed in WO95/31448, WO97/18198, WO98/02424, WO98/05670 and WO00/015622.

The present invention provides a compound of formula (I):



wherein

A is optionally substituted C_{1-6} alkylene, optionally substituted C_{2-6} alkenylene, optionally substituted C_{2-6} alkynylene, optionally substituted cycloalkylene, optionally substituted C_{1-6} alkyleneoxy, optionally substituted oxy(C_{1-6})alkylene, optionally substituted C_{1-6} alkylenethio, optionally substituted thio(C_{1-6})alkylene, optionally substituted C_{1-6} alkyleneamino, optionally substituted amino(C_{1-6})alkylene, optionally substituted [C_{1-6} alkyleneoxy(C_{1-6})alkylene], optionally substituted [C_{1-6} alkylenethio(C_{1-6})alkylene], optionally substituted [C_{1-6} alkylenesulfinyl(C_{1-6})alkylene], optionally substituted [C_{1-6} alkylenesulfonyl(C_{1-6})alkylene] or optionally substituted [C_{1-6} alkyleneamino(C_{1-6})alkylene];

B is N, N-oxide or CR^{18} ;

D is O, S, NR^7 , $CR^8=CR^9$, $CR^8=N$, $N=CR^9$, $CR^8=N(O)$ or $N(O)=CR^9$;

E is N, N-oxide or CR^{12} ;

W is CR^1 or N;

X is N, N-oxide or CR^{11} and R^{11} is hydrogen, optionally substituted C_{1-6} alkyl or optionally substituted phenyl, with the proviso that the ring containing D, E, X and W contains at least one atom that is other than a carbon atom;

M is $N(R^{51})C(=Y)$, $N=C(OR^{52})$, $N=C(SR^{53})$ or $N=C(NR^{54}R^{55})$ where N is the atom of attachment to the group "A";

Y is O, S or NR¹³;

Z is O, S or NR¹⁴;

R¹ is hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₃₋₇ cycloalkyl, cyano, nitro or SF₅;

R⁷ is hydrogen or optionally substituted C₁₋₆ alkyl;

R⁵¹ is hydrogen, optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, optionally substituted phenoxycarbonyl, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, optionally substituted C₁₋₆ arylthio, optionally substituted C₁₋₆ arylsulfinyl, optionally substituted C₁₋₆ arylsulfonyl or R²⁰R²¹NS(O)_p where p is 0, 1 or 2, especially 0;

R⁵² is optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, amino, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, optionally substituted phenoxycarbonyl, tri(C₁₋₄)alkylsilyl, aryl-di(C₁₋₄)alkylsilyl, (C₁₋₄)alkyldiarylsilyl or triarylsilyl;

R⁵³ is optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl or optionally substituted phenoxycarbonyl;

R⁵⁴ and R⁵⁵ are, independently optionally substituted C₁₋₁₀ alkyl, optionally substituted C₁₋₆ alkoxy, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, hydroxy, amino, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, or optionally substituted phenoxycarbonyl;

R^3 , R^4 and R^5 are, independently, hydrogen, halogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{1-6} alkoxy, optionally substituted C_{1-6} alkylthio, optionally substituted C_{1-6} alkylsulfinyl, optionally substituted C_{1-6} alkylsulfonyl, cyano, nitro, optionally substituted C_{1-6} alkylcarbonyl, optionally substituted C_{1-6} alkoxy carbonyl or SF_5 ; R^6 is

5 hydrogen, halogen, cyano, optionally substituted C_{1-20} alkyl, optionally substituted C_{2-20} alkenyl, optionally substituted C_{2-20} alkynyl, optionally substituted C_{3-7} cycloalkyl, optionally substituted C_{5-6} cycloalkenyl, formyl, optionally substituted C_{1-20} alkoxy carbonyl, optionally substituted C_{1-20} alkylcarbonyl, aminocarbonyl, optionally substituted C_{1-20} alkylaminocarbonyl, optionally substituted di(C_{1-20})alkylaminocarbonyl, optionally

10 substituted aryloxy carbonyl, optionally substituted arylcarbonyl, optionally substituted arylaminocarbonyl, optionally substituted N-alkyl-N-arylaminocarbonyl, optionally substituted diarylaminocarbonyl, optionally substituted heteroaryloxy carbonyl, optionally substituted heteroarylcarbonyl, optionally substituted heteroarylaminocarbonyl, optionally substituted N-alkyl-N-heteroarylaminocarbonyl, optionally substituted

15 diheteroarylaminocarbonyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted heterocyclyl, HS, optionally substituted C_{1-20} alkylthio, optionally substituted C_{1-20} alkylsulfinyl, optionally substituted C_{1-20} alkylsulfonyl, optionally substituted arylthio, optionally substituted arylsulfinyl, optionally substituted arylsulfonyl, $R^{26}O$, $R^{28}R^{29}N$ or $R^{31}ON=C(R^{27})$;

20 R^8 and R^9 are, independently, hydrogen, halogen, cyano, nitro, optionally substituted C_{1-6} alkyl, optionally substituted C_{2-6} alkenyl, optionally substituted C_{2-6} alkynyl or optionally substituted C_{1-6} alkoxy;

R^{12} is hydrogen, halogen, optionally substituted C_{1-6} alkyl, optionally substituted C_{2-6} alkenyl, optionally substituted C_{2-6} alkynyl, optionally substituted C_{1-6} alkoxy, optionally

25 substituted C_{1-6} alkylthio, optionally substituted C_{1-6} alkylsulfinyl, optionally substituted C_{1-6} alkylsulfonyl, cyano, nitro, formyl, optionally substituted C_{1-6} alkylcarbonyl, optionally substituted C_{1-6} alkoxy carbonyl, SF_5 , $R^{32}ON=C(R^{30})$, or R^1 and R^{12} together with the atoms to which they are attached may be joined to form a five, six or seven-membered saturated or unsaturated, carbocyclic or heterocyclic ring which may contain one or two heteroatoms

30 selected from O, N or S and which may be optionally substituted by C_{1-6} alkyl, C_{1-6} haloalkyl or halogen;

R^{13} is hydrogen, cyano, nitro, optionally substituted C_{1-6} alkyl, optionally substituted C_{3-7} cycloalkyl, optionally substituted (C_{2-6})alkenyl(C_{1-6})alkyl, optionally substituted

(C₂₋₆)alkynyl(C₁₋₆)alkyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkoxy carbonyl, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, optionally substituted C₁₋₆ alkylcarbonylamino, optionally substituted C₁₋₆ alkoxy carbonylamino, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, optionally substituted arylthio, optionally substituted arylsulfinyl, optionally substituted arylsulfonyl or C₁₋₆ alkylcarbonyloxy;

R¹⁴ is hydrogen, cyano, optionally substituted C₁₋₈ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted [C₃₋₇ cycloalkyl(C₁₋₆)alkyl], C₁₋₆ alkoxy(C₁₋₆)alkyl, optionally substituted C₁₋₆ alkoxy carbonyl, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkylaminocarbonyl, optionally substituted di(C₁₋₆)alkylaminocarbonyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted alkylsulfonyl or optionally substituted arylsulfonyl;

R¹⁸ is hydrogen, halogen, nitro, cyano, optionally substituted C₁₋₈ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₆ alkoxy carbonyl, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkylaminocarbonyl, optionally substituted di(C₁₋₆)alkylaminocarbonyl, optionally substituted phenyl or optionally substituted heteroaryl;

R²⁰ and R²¹ are, independently, optionally substituted C₁₋₆ alkyl or R²⁰ and R²¹ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups;

R²⁶ is hydrogen, optionally substituted C₁₋₂₀ alkyl, optionally substituted [C₂₋₂₀ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₂₀ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted aryl, optionally substituted heteroaryl, optionally substituted [heterocyclyl(C₁₋₆)alkylCH=N] or di(C₁₋₆)alkylC=N;

R²⁸ and R²⁹ are, independently, hydrogen, optionally substituted C₁₋₂₀ alkyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted [C₂₋₂₀ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₂₀ alkynyl(C₁₋₆)alkyl], optionally substituted C₁₋₂₀ alkoxy carbonyl, optionally substituted phenoxy carbonyl, formyl, optionally substituted C₁₋₂₀ alkylcarbonyl,

optionally substituted C₁₋₂₀ alkylsulfonyl or optionally substituted phenylsulfonyl; or R²⁸ and R²⁹ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups;

5 R²⁷ and R³⁰ are independently hydrogen, optionally substituted phenyl or optionally substituted C₁₋₆ alkyl; and

R³¹ and R³² are, independently, hydrogen, optionally substituted phenyl (C₁₋₂)alkyl or optionally substituted C₁₋₂₀ alkyl provided that when A is CH₂, M is CONH, D is S, and X is N then E and W cannot both be C-Cl.

10 The ring containing D, E W and X may contain no more than 3 heteroatoms.

The compounds of formula (I) may exist in different geometric or optical isomers or tautomeric forms. This invention covers all such isomers and tautomers and mixtures thereof in all proportions as well as isotopic forms such as deuterated compounds.

When present, optional substituents on alkylene, alkenylene or alkynylene moieties
 15 include, subject to valency constraints, one or more of hydroxy, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxy, cyano, =O, =NR³³, =CR³⁴R³⁵; wherein R³³ is C₁₋₆ alkyl, C₁₋₆ haloalkyl, OR³⁶ or R³⁷R³⁸N; R³⁶ is C₁₋₆ alkyl, C₁₋₆ haloalkyl or phenyl(C₁₋₂)alkyl; R³⁷ and R³⁸ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆
 20 alkoxycarbonyl(C₁₋₆)alkyl, carboxy(C₁₋₆)alkyl, phenyl(C₁₋₂)alkyl, or R³⁷ and R³⁸ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups; R³⁴ and R³⁵ are, independently, hydrogen, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkyl, cyano, C₁₋₆ alkoxycarbonyl,
 25 C₁₋₆ alkylcarbonyl or R³⁹R⁴⁰N; R³⁹ and R⁴⁰ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl(C₁₋₆)alkyl, carboxy(C₁₋₆)alkyl, phenyl(C₁₋₂)alkyl, or R³⁹ and R⁴⁰ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected
 30 from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups.

One group of preferred optional substituents on alkylene, alkenylene or alkynylene moieties include, subject to valency constraints, one or more of halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxy, cyano, =O, =NR³³ and

=CR³⁴R³⁵, wherein R³³ is C₁₋₆ alkyl, C₁₋₆ haloalkyl, OR³⁶ or R³⁷R³⁸N; where R³⁴ and R³⁵ are, independently, hydrogen, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkyl, cyano, C₁₋₆ alkoxy carbonyl, C₁₋₆ alkyl carbonyl or R³⁹R⁴⁰N; R³⁶ is C₁₋₆ alkyl, C₁₋₆ haloalkyl or phenyl(C₁₋₂)alkyl; R³⁷ and R³⁸ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxy carbonyl(C₁₋₆)alkyl, carboxy(C₁₋₆)alkyl or phenyl(C₁₋₂)alkyl or R³⁷ and R³⁸ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups; R³⁹ and R⁴⁰ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxy carbonyl(C₁₋₆)alkyl, carboxy(C₁₋₆)alkyl or phenyl(C₁₋₂)alkyl; or R³⁹ and R⁴⁰ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups.

Each alkyl moiety is a straight or branched chain and is, for example, methyl, ethyl, *n*-propyl, *n*-butyl, *n*-pentyl, *n*-hexyl, *iso*-propyl, *n*-butyl, *sec*-butyl, *iso*-butyl, *tert*-butyl or *neo*-pentyl.

When present, the optional substituents on alkyl include one or more of halogen, nitro, cyano, NCS-, C₃₋₇ cycloalkyl (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), C₅₋₇ cycloalkenyl (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), hydroxy, C₁₋₁₀ alkoxy, C₁₋₁₀ alkoxy(C₁₋₁₀)alkoxy, tri(C₁₋₄)alkylsilyl(C₁₋₆)alkoxy, C₁₋₆ alkoxy carbonyl(C₁₋₁₀)alkoxy, C₁₋₁₀ haloalkoxy, C₁₋₁₀ deuterioalkoxy, aryl(C₁₋₄)alkoxy (where the aryl group may be further optionally substituted), C₃₋₇ cycloalkyloxy (where the cycloalkyl group may be optionally substituted with C₁₋₆ alkyl or halogen), C₁₋₁₀ alkenyloxy, C₁₋₁₀ alkynyloxy, SH, C₁₋₁₀ alkylthio, C₁₋₁₀ haloalkylthio, aryl(C₁₋₄)alkylthio (where the aryl group may be further optionally substituted), C₃₋₇ cycloalkylthio (where the cycloalkyl group may be optionally substituted with C₁₋₆ alkyl or halogen), tri(C₁₋₄)alkylsilyl(C₁₋₆)alkylthio, arylthio (where the aryl group may be further optionally substituted), C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl, C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, arylsulfonyl (where the aryl group may be further optionally substituted), tri(C₁₋₄)alkylsilyl, aryldi(C₁₋₄)alkylsilyl, (C₁₋₄)alkyldiarylsilyl, triarylsilyl, C₁₋₁₀ alkyl carbonyl, HO₂C, C₁₋₁₀ alkoxy carbonyl, aminocarbonyl, C₁₋₆ alkylaminocarbonyl, di(C₁₋₆ alkyl)aminocarbonyl, N-(C₁₋₃ alkyl)-N-(C₁₋₃

alkoxy)aminocarbonyl, C₁₋₆ alkylcarbonyloxy, arylcarbonyloxy (where the aryl group may be further optionally substituted), di(C₁₋₆)alkylaminocarbonyloxy, aryl (which itself may be further optionally substituted), heteroaryl (which itself may be further optionally substituted), heterocyclyl (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), aryloxy, (which itself may be further optionally substituted), heteroaryloxy, (which itself may be further optionally substituted), heterocyclyloxy, (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), amino, C₁₋₆ alkylamino, di(C₁₋₆)alkylamino, alkylcarbonylamino, N-alkylcarbonyl-N-alkylamino.

One group of optional preferred substituents for alkyl include one or more of halogen, nitro, cyano, HO₂C, C₁₋₁₀ alkoxy (itself optionally substituted by C₁₋₁₀ alkoxy), aryl(C₁₋₄)-alkoxy, C₁₋₁₀ alkylthio, C₁₋₁₀ alkylcarbonyl, C₁₋₁₀ alkoxycarbonyl, C₁₋₆ alkylaminocarbonyl, di(C₁₋₆ alkyl)aminocarbonyl, (C₁₋₆)alkylcarbonyloxy, optionally substituted phenyl, heteroaryl, aryloxy, arylcarbonyloxy, heteroaryloxy, heterocyclyl, heterocyclyloxy, C₃₋₇ cycloalkyl (itself optionally substituted with (C₁₋₆)alkyl or halogen), C₃₋₇ cycloalkyloxy, C₅₋₇ cycloalkenyl, C₁₋₆ alkylsulfonyl, C₁₋₆ alkylsulfinyl, tri(C₁₋₄)alkylsilyl, tri(C₁₋₄)alkylsilyl-(C₁₋₆)alkoxy, aryldi(C₁₋₄)alkylsilyl, (C₁₋₄)alkyldiarylsilyl and triarylsilyl.

Alkenyl and alkynyl moieties can be in the form of straight or branched chains, and the alkenyl moieties, where appropriate, can be of either the (E)- or (Z)-configuration. Examples are vinyl, allyl and propargyl. When present, the optional substituents on alkenyl or alkynyl include one or more of the substituents listed above for alkyl but especially preferred substituents are one or more of halogen, aryl and C₃₋₇ cycloalkyl.

In the context of this specification acyl is optionally substituted C₁₋₆ alkylcarbonyl (for example acetyl), optionally substituted C₂₋₆ alkenylcarbonyl, optionally substituted C₂₋₆ alkynylcarbonyl, optionally substituted arylcarbonyl (for example benzoyl) or optionally substituted heteroarylcarbonyl.

Halogen is fluorine, chlorine, bromine or iodine.

Haloalkyl groups are alkyl groups which are substituted with one or more of the same or different halogen atoms and are, for example, CF₃, CF₂Cl, CF₃CH₂ or CHF₂CH₂.

Aryl includes naphthyl, anthracyl, fluorenyl and indenyl but is preferably phenyl.

The term heteroaryl refers to an aromatic ring containing up to 10 atoms including one or more heteroatoms (preferably one or two heteroatoms) selected from O, S and N. Examples of such rings include pyridine, pyrimidine, furan, quinoline, quinazoline, pyrazole, thiophene, thiazole, oxazole and isoxazole.

The terms heterocycle and heterocyclyl refer to a non-aromatic ring containing up to 10 atoms including one or more (preferably one or two) heteroatoms selected from O, S and N. Examples of such rings include 1,3-dioxolane, tetrahydrofuran and morpholine. It is preferred that heterocyclyl is optionally substituted by C₁₋₆ alkyl.

5 Cycloalkyl includes cyclopropyl, cyclopentyl and cyclohexyl. The optional substituents for cycloalkyl include one or more of the substituents listed above for alkyl but especially preferred substituents are one or more of halogen, cyano and C₁₋₃ alkyl.

Cycloalkenyl includes cyclopentenyl and cyclohexenyl. The optional substituents for cycloalkenyl include one or more of the substituents listed above for alkyl but especially
10 preferred substituents include one or more of C₁₋₃ alkyl, halogen and cyano.

Carbocyclic rings include aryl, cycloalkyl and cycloalkenyl groups.

For substituted aryl such as phenyl and heteroaryl groups the substituents are independently selected from one or more of halogen, nitro, cyano, NCS-, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₂₋₆ alkenyl, C₂₋₆ haloalkenyl, C₂₋₆ alkynyl, C₃₋₇ cycloalkyl
15 (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), C₅₋₇ cycloalkenyl (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), hydroxy, C₁₋₁₀ alkoxy, C₁₋₁₀ alkoxy(C₁₋₁₀)alkoxy, tri(C₁₋₄)alkylsilyl(C₁₋₆)alkoxy, C₁₋₆ alkoxycarbonyl(C₁₋₁₀)alkoxy, C₁₋₁₀ haloalkoxy, C₁₋₁₀ deutoalkoxy, aryl(C₁₋₄)alkoxy (where the aryl group may be further optionally substituted), C₃₋₇ cycloalkyloxy (where the cycloalkyl group may be optionally
20 substituted with C₁₋₆ alkyl or halogen), C₁₋₁₀ alkenyloxy, C₁₋₁₀ alkynyloxy, SH, C₁₋₁₀ alkylthio, C₁₋₁₀ haloalkylthio, aryl(C₁₋₄)alkylthio (where the aryl group may be further optionally substituted), C₃₋₇ cycloalkylthio (where the cycloalkyl group may be optionally substituted with C₁₋₆ alkyl or halogen), tri(C₁₋₄)alkylsilyl(C₁₋₆)alkylthio, arylthio (where the aryl group may be further optionally substituted), C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl,
25 C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, arylsulfonyl (where the aryl group may be further optionally substituted), tri(C₁₋₄)alkylsilyl, aryl-di(C₁₋₄)alkylsilyl, (C₁₋₄)alkyl-diarylsilyl, triarylsilyl, C₁₋₁₀ alkylcarbonyl, HO₂C, C₁₋₁₀ alkoxycarbonyl, aminocarbonyl, C₁₋₆ alkylaminocarbonyl, di(C₁₋₆ alkyl)aminocarbonyl, N-(C₁₋₃ alkyl)-N-(C₁₋₃ alkoxy)aminocarbonyl, C₁₋₆ alkylcarbonyloxy, arylcarbonyloxy (where the aryl group may be
30 further optionally substituted), di(C₁₋₆)alkylaminocarbonyloxy, aryl (which itself may be further optionally substituted), heteroaryl (which itself may be further optionally substituted), heterocyclyl (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), aryloxy, (which itself may be further optionally substituted), heteroaryloxy, (which itself may be

further optionally substituted), heterocyclyloxy, (which itself may be optionally substituted with C₁₋₆ alkyl or halogen), amino, C₁₋₆ alkylamino, di(C₁₋₆)alkylamino, alkylcarbonylamino, N-alkylcarbonyl-N-alkylamino.

For substituted heterocyclyl groups the substituents include one or more of the
 5 substituents listed above for alkyl. For substituted phenyl moieties, heterocyclyl and heteroaryl groups one set of preferred substituents are independently selected from one or more of halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl, C₂₋₆ alkenyl, C₂₋₆ haloalkenyl, C₂₋₆ alkynyl, C₃₋₇
 10 cycloalkyl, nitro, cyano, CO₂H, C₁₋₆ alkylcarbonyl, C₁₋₆ alkoxycarbonyl, R⁴¹R⁴²N or R⁴³R⁴⁴NC(O) wherein R⁴¹, R⁴², R⁴³ and R⁴⁴ are, independently, hydrogen or C₁₋₆ alkyl.

It is to be understood that dialkylamino substituents include those where the dialkyl groups together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected
 15 from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups. When heterocyclic rings are formed by joining two groups on an N atom, the resulting rings are suitably pyrrolidine, piperidine, thiomorpholine and morpholine each of which may be substituted by one or two (C₁₋₆)alkyl groups.

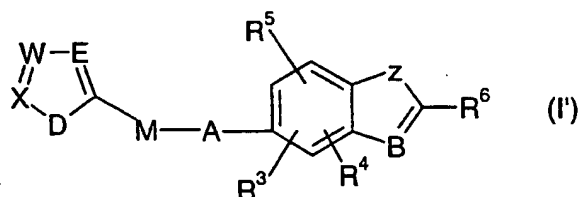
In one particular aspect the present invention provides a compound of formula (IA)
 20 which are compounds of formula (I) where B, E, M, W and Z have the values as defined for formula (I) above and X is N or CR¹¹ where R¹¹ is hydrogen, C₁₋₆ alkyl or phenyl, and D is O, S, NR⁷, CR⁸=CR⁹, CR⁸=N, N=CR⁹, CR⁸=N(O) or N(O)=CR⁹ where R⁸ and R⁹ are as defined in relation to formula (I) above, R⁷ is hydrogen or C₁₋₆ alkyl, R¹ is hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₂₋₆ alkenyl, optionally
 25 substituted C₂₋₆ alkynyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₃₋₇ cycloalkyl, cyano, nitro or SF₅; R¹² is hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl,
 30 cyano, nitro, formyl, R³²ON=C(R³⁰), optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkoxycarbonyl or SF₅; or R¹ and R¹² together with the atoms to which they are attached may be joined to form a five, six or seven-membered saturated or unsaturated ring carbocyclic or heterocyclic ring which may contain one or two hetero atoms selected from

O, N or S and which may be optionally substituted by C₁₋₆ alkyl, C₁₋₆ haloalkyl or halogen; R³, R⁴ and R⁵ are, independently, hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, cyano, nitro, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkoxycarbonyl or SF₅; R⁶ is hydrogen, halogen, cyano, optionally substituted C₁₋₂₀ alkyl, optionally substituted C₂₋₂₀ alkenyl, optionally substituted C₂₋₂₀ alkynyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₅₋₆ cycloalkenyl, formyl, optionally substituted C₁₋₂₀ alkoxycarbonyl, optionally substituted C₁₋₂₀ alkylcarbonyl, aminocarbonyl, optionally substituted C₁₋₂₀ alkylaminocarbonyl, optionally substituted di(C₁₋₂₀)alkylaminocarbonyl, optionally substituted aryloxy carbonyl, optionally substituted arylcarbonyl, optionally substituted arylaminocarbonyl, optionally substituted N-alkyl-N-arylaminocarbonyl, optionally substituted diarylaminocarbonyl, optionally substituted heteroaryloxy carbonyl, optionally substituted heteroarylcarbonyl, optionally substituted heteroarylaminocarbonyl, optionally substituted alkylheteroarylaminocarbonyl, optionally substituted diheteroarylaminocarbonyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted heterocyclyl, R²⁶O, HS, optionally substituted C₁₋₂₀ alkylthio, optionally substituted C₁₋₂₀ alkylsulfinyl, optionally substituted C₁₋₂₀ alkylsulfonyl, optionally substituted arylthio, optionally substituted arylsulfinyl, optionally substituted arylsulfonyl, R²⁸R²⁹N or R³¹ON=C(R²⁷); A is optionally substituted C₁₋₆ alkylene, optionally substituted C₂₋₆ alkenylene, optionally substituted C₂₋₆ alkynylene, optionally substituted C₁₋₆ alkyleneoxy, optionally substituted oxy(C₁₋₆)alkylene, optionally substituted C₁₋₆ alkyleneethio, optionally substituted thio(C₁₋₆)alkylene, optionally substituted C₁₋₆ alkyleneamino, optionally substituted amino(C₁₋₆)alkylene, optionally substituted [C₁₋₆ alkyleneoxy(C₁₋₆)alkylene], optionally substituted [C₁₋₆ alkyleneethio(C₁₋₆)alkylene], optionally substituted [C₁₋₆ alkylenesulfinyl(C₁₋₆)alkylene], optionally substituted [C₁₋₆ alkylenesulfonyl(C₁₋₆)alkylene] or optionally substituted [C₁₋₆ alkyleneamino(C₁₋₆)alkylene]; R¹³ is hydrogen, cyano, nitro, optionally substituted C₁₋₆ alkyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted (C₂₋₆)alkenyl(C₁₋₆)alkyl, optionally substituted (C₂₋₆)alkynyl(C₁₋₆)alkyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkoxycarbonyl, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, optionally substituted C₁₋₆ alkylcarbonylamino, optionally substituted C₁₋₆ alkoxycarbonylamino, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆

alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, optionally substituted arylthio, optionally substituted arylsulfinyl, optionally substituted arylsulfonyl or C₁₋₆ acyloxy; R¹⁴ is hydrogen, cyano, optionally substituted C₁₋₈ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl-(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted [C₃₋₇ cycloalkyl(C₁₋₆)alkyl], C₁₋₆ alkoxy(C₁₋₆)alkyl, optionally substituted C₁₋₆ alkoxycarbonyl, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkylaminocarbonyl, optionally substituted di(C₁₋₆)alkyl-aminocarbonyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted alkylsulfonyl or optionally substituted arylsulfonyl; and R¹⁸ is hydrogen, halogen, nitro, cyano, optionally substituted C₁₋₈ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₆ alkoxycarbonyl, optionally substituted C₁₋₆ alkylcarbonyl, optionally substituted C₁₋₆ alkylaminocarbonyl, optionally substituted di(C₁₋₆)alkylaminocarbonyl, optionally substituted phenyl or optionally substituted heteroaryl; and R⁵¹ is hydrogen, optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, optionally substituted phenoxycarbonyl, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, optionally substituted C₁₋₆ arylthio, optionally substituted C₁₋₆ arylsulfinyl, optionally substituted C₁₋₆ arylsulfonyl or R²⁰R²¹NS.

In a further aspect the present invention also provides a compound of formula (IB) which are compounds of formula (I) where A, B, E, M, W, Z, R³, R⁴, R⁵, and R⁶ have the values as defined for formula (I) above and D is O, S, NR⁷, CR⁸=CR⁹, CR⁸=N, N=CR⁹, where R⁸ and R⁹ are as defined in relation to formula (I) above.

In yet another aspect the present invention provides a compound of formula (I')



where A, B, D, E, M, W, X, Z, R³, R⁴, R⁵, and R⁶ have the values as defined for formula (I) above. The invention also provides a compound of formula (IA') which is a compound of formula I' wherein A, B, D, E, M, W, X, Z, R³, R⁴, R⁵, and R⁶ have the values as defined for formula (IA) above. There is further provided a compound of formula (IB') which is a
 5 compound of formula I' wherein A, B, D, E, M, W, X, Z, R³, R⁴, R⁵, and R⁶ have the values as defined for formula (IB) above.

In another aspect the present invention provides a compound of formula (IC) which is a compound of formula (I') wherein,

D is O, S, NR⁷, CR⁸=CR⁹, where R⁷ is C₁₋₆ alkyl, especially, O, S or NR⁷ where R⁷

10 is C₁₋₆ alkyl

E is N or CR¹²;

W is CR¹ or N;

X is N or CR¹¹; R¹¹ is hydrogen, C₁₋₆ alkyl or phenyl with the proviso that at least one of W and X is N;

15 R¹ is hydrogen, halogen, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ cyanoalkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₃₋₆ cycloalkyl, C₃₋₇ cycloalkyl(C₁₋₄)alkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, cyano, nitro or SF₅;

A is C₁₋₆ alkylene, C₁₋₆ alkenylene, C₁₋₆ alkyleneoxy, oxy(C₁₋₆)alkylene, C₁₋₆ alkyleneamino or C₁₋₆ alkyleneethio, each of which is optionally substituted by C₁₋₃ alkyl, C₁₋₃ haloalkyl, C₁₋₃ cyanoalkyl, halogen, C₁₋₃ alkoxy, C₁₋₆ alkoxycarbonyl, cyano, =O, =NR¹⁵ or =CR¹⁶R¹⁷;

B is N or CR¹⁸;

M is N(R⁵¹)C(=Y), N=C(SR⁵³) or N=C(OR⁵²), especially N(R⁵¹)C(=Y) or N=C(SR⁵³)

where O or N is the atom of attachment to the group "A";

25 Y is O, S or NR¹³;

Z is O, S or NR¹⁴;

R⁵¹ is hydrogen, C₁₋₁₀ alkyl, benzyloxymethyl, benzoyloxymethyl, C₁₋₆alkoxy-(C₁₋₆)alkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl (especially allyl), C₂₋₆ alkynyl(C₁₋₆)alkyl (especially propargyl), C₁₋₁₀ alkylcarbonyl or C₁₋₁₀ alkoxycarbonyl (especially isobutoxycarbonyl);

30 R⁵² is C₁₋₁₀ alkyl, C₁₋₁₀ haloalkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, C₃₋₇ cycloalkyl, C₁₋₆ alkylamino, di(C₁₋₆)alkylamino, phenyl(C₁₋₄)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy);

R⁵³ is C₁₋₁₀ alkyl, benzyloxymethyl, benzoyloxymethyl, C₁₋₆alkoxy(C₁₋₆)alkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl (especially allyl), C₂₋₆ alkynyl(C₁₋₆)alkyl (especially propargyl), C₁₋₁₀ alkylcarbonyl or C₁₋₁₀ alkoxycarbonyl (especially *isobutoxycarbonyl*);

R³, R⁴ and R⁵ are independently selected from hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl, C₁₋₆ haloalkyl, cyano, nitro, C₁₋₆ alkylcarbonyl, C₁₋₆ alkoxycarbonyl or SF₅;

R⁶ is cyano, C₁₋₈ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₃₋₇ cycloalkyl, C₃₋₇ halocycloalkyl, C₃₋₇ cyanocycloalkyl, C₁₋₃ alkyl(C₃₋₇)cycloalkyl, C₁₋₃ alkyl-(C₃₋₇)halocycloalkyl, C₅₋₆ cycloalkenyl, C₃₋₇ cycloalkyl(C₁₋₆)alkyl, C₅₋₆ cycloalkenyl-(C₁₋₆)alkyl, C₂₋₆ haloalkenyl, C₁₋₆ cyanoalkenyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₃₋₆ alkenyloxy-(C₁₋₆)alkyl, C₃₋₆ alkynyloxy(C₁₋₆)alkyl, aryloxy(C₁₋₆)alkyl, formyl, C₁₋₆ carboxyalkyl, C₁₋₆ alkylcarbonyl(C₁₋₆)alkyl, C₂₋₆ alkenylcarbonyl(C₁₋₆)alkyl, C₂₋₆ alkynylcarbonyl(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl(C₁₋₆)alkyl, C₃₋₆ alkenyloxycarbonyl(C₁₋₆)alkyl, C₃₋₆ alkynyloxycarbonyl-(C₁₋₆)alkyl, aryloxycarbonyl(C₁₋₆)alkyl, C₁₋₆ alkylthio(C₁₋₆)alkyl, C₁₋₆ alkylsulfinyl(C₁₋₆)alkyl, C₁₋₆ alkylsulfonyl(C₁₋₆)alkyl, aminocarbonyl(C₁₋₆)alkyl, aminocarbonyl(C₂₋₆)alkenyl, aminocarbonyl(C₂₋₆)alkynyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkyl, di(C₁₋₆)alkylamino-carbonyl(C₁₋₆)alkyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkenyl, di(C₁₋₆)alkylamino-carbonyl(C₁₋₆)alkynyl, C₁₋₆ alkoxycarbonyl, C₁₋₆ alkylcarbonyl, aminocarbonyl, C₁₋₆ alkylaminocarbonyl, di(C₁₋₆)alkylaminocarbonyl, phenyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), phenyl(C₁₋₄)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), phenyl(C₂₋₄)alkenyl, (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl(C₁₋₄)alkyl (where the heteroaryl may be substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl(C₁₋₄)alkyl (where the heterocyclyl may be substituted by halo, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), R²⁶O, C₁₋₈ alkylthio, R²⁸R²⁹N or R³¹ON=C(R²⁷);

R⁸ and R⁹ are, independently, hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₂₋₆ alkenyl, C₁₋₆ alkynyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy;

R^{12} is hydrogen, halogen, C_{1-6} alkyl, C_{2-6} alkenyl, C_{1-6} alkynyl, C_{1-6} haloalkyl, C_{1-6} alkoxy, C_{1-6} alkoxy (C_{1-6})alkyl, C_{1-6} haloalkoxy, C_{1-6} alkylthio, C_{1-6} haloalkylthio, C_{1-6} alkylsulfinyl, C_{1-6} haloalkylsulfinyl, C_{1-6} alkylsulfonyl, C_{1-6} haloalkylsulfonyl, C_{1-6} haloalkyl, cyano, nitro, formyl, $CH=NOR^{32}$, C_{1-6} alkylcarbonyl, C_{1-6} alkoxy carbonyl or SF_5 ; or together
 5 R^1 and R^{12} together with the atoms to which they are attached may be joined to form a five, six or seven-membered saturated or unsaturated ring carbocyclic or heterocyclic ring which may contain one or two hetero atoms selected from O, N or S and which may be optionally substituted by C_{1-6} alkyl, C_{1-6} haloalkyl or halogen;

R^{13} is cyano, nitro, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{3-7} cycloalkyl, C_{3-7} cycloalkyl-
 10 (C_{1-6})alkyl, $CH_2(C_{2-6})$ alkenyl, $CH_2(C_{2-6})$ alkynyl, phenyl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy) heteroaryl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), C_{1-6} alkylcarbonyl, C_{1-6} alkoxy carbonyl, C_{1-6} alkylamino, di(C_{1-6})alkylamino, C_{1-6} alkylcarbonylamino, C_{1-6} alkoxy carbonylamino, C_{1-6} alkoxy, C_{1-6} alkylthio, C_{1-6} alkylsulfinyl,
 15 C_{1-6} alkylsulfonyl, C_{1-6} haloalkylthio, C_{1-6} haloalkylsulfinyl, C_{1-6} haloalkylsulfonyl, arylthio, arylsulfinyl, arylsulfonyl or $OCO(C_{1-6})$ alkyl;

R^{14} is hydrogen, C_{1-8} alkyl, C_{1-6} haloalkyl, C_{1-6} cyanoalkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{2-6} haloalkenyl, C_{3-7} cycloalkyl(C_{1-6})alkyl, C_{1-6} alkoxy(C_{1-6})alkyl, C_{1-6} alkoxy carbonyl, C_{1-6} alkylcarbonyl, C_{1-6} alkylaminocarbonyl, di(C_{1-6})alkylaminocarbonyl,
 20 phenyl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy) or heteroaryl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy);

R^{15} is C_{1-6} alkyl, OR^{22} or $NR^{23}R^{24}$;

R^{16} is hydrogen, C_{1-6} alkyl or C_{1-6} haloalkyl;

25 R^{17} is hydrogen, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy, cyano, C_{1-6} alkoxy carbonyl, C_{1-6} alkylcarbonyl or $NR^{46}R^{47}$;

R^{18} is hydrogen, halogen, nitro, cyano, C_{1-8} alkyl, C_{1-6} haloalkyl, C_{1-6} cyanoalkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{2-6} haloalkenyl, C_{3-7} cycloalkyl(C_{1-6})alkyl, C_{1-6} alkoxy(C_{1-6})alkyl, C_{1-6} alkoxy carbonyl, C_{1-6} alkylcarbonyl, C_{1-6} alkylaminocarbonyl,
 30 di(C_{1-6})alkylaminocarbonyl, C_{1-6} alkoxy carbonyl(C_{1-6})alkyl, C_{1-6} alkylcarbonyl(C_{1-6})alkyl, C_{1-6} alkylaminocarbonyl(C_{1-6})alkyl, di(C_{1-6})alkylaminocarbonyl(C_{1-6})alkyl, phenyl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), phenyl(C_{1-6})alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano,

C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or heteroaryl(C₁₋₆)alkyl (wherein the heteroaryl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy);

5 R²⁰ and R²¹ are, independently, hydrogen, C₁₋₆ alkyl, CH₂(C₁₋₄ haloalkyl), C₁₋₆ cyanoalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkylthio(C₁₋₆)alkyl, C₁₋₆ alkoxy(C₁₋₆)alkoxy-(C₁₋₆)alkyl, phenyl(C₁₋₄)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl(C₁₋₄)alkyl (wherein the heteroaryl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl(C₁₋₄)alkyl (wherein the heterocyclyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), or R²⁰ and R²¹ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups;

15 R²² is C₁₋₆ alkyl or optionally substituted phenyl(C₁₋₂)alkyl;

 R²³ and R²⁴ are, independently, hydrogen, C₁₋₈ alkyl or phenyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy);

 R²⁶ is hydrogen, C₁₋₈ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, phenyl(C₁₋₄)alkyl, (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl(C₁₋₄)alkyl (wherein the heteroaryl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl(C₁₋₄)alkyl (wherein the heterocyclyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₁₋₆ alkoxycarbonyl(C₁₋₆)alkyl or N=C(CH₃)₂;

 R²⁷ is C₁₋₆ alkyl, C₁₋₆ haloalkyl or phenyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy),

30 R²⁸ and R²⁹ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₃₋₆ alkenyl, C₃₋₆ alkynyl, C₃₋₇ cycloalkyl(C₁₋₄)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl, or R²⁸ and R²⁹ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero

atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups;

R³⁰ is hydrogen or C₁₋₃ alkyl;

R³¹ and R³² are, independently, C₁₋₆ alkyl or phenyl(C₁₋₂)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy); and

R⁴⁶ and R⁴⁷ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₃₋₆ alkenyl, C₃₋₆ alkynyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl(C₁₋₆)alkyl, carboxy(C₁₋₆)alkyl or phenyl(C₁₋₂)alkyl; or R⁴⁶ and R⁴⁷ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups.

Preferably A is C₁₋₆ alkylene (optionally substituted by C₁₋₃ alkyl, C₁₋₃ haloalkyl, C₁₋₃ cyanoalkyl, C₁₋₆ alkoxycarbonyl), -C(O)- or C₁₋₆ alkyleneoxy;

More preferably A is C₁₋₄ alkylene -C(O)- or C₁₋₄ alkyleneoxy; or alternatively is C₁₋₄ alkylene (optionally substituted by C₁₋₃ alkyl).

Even more preferably A is CH₂, CH(CH₃) or CH₂O.

Most preferably A is CH₂ or CH(CH₃).

A preferred value of M is C(O)NR⁵¹ where the N atom is attached to the group "A"

Preferably Z is O or S, more preferably O.

Preferably B is N.

Preferred values for D are CH=CH, S or NR⁷ where R⁷ is C₁₋₆ alkyl, more preferably D is S or N-C₁₋₆ alkyl, most preferably N-C₁₋₆ alkyl.

Preferably E is N or CR¹² where R¹² is hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkoxy (C₁₋₆)alkyl, C₁₋₆ alkylthio or SF₅; or R¹ and R¹² together with the atoms to which they are attached form a benzene ring optionally substituted by C₁₋₆ alkyl C₁₋₆ haloalkyl or halogen.

W is preferably N or CR¹.

X is N or CR¹¹ where R¹¹ is hydrogen, C₁₋₄ alkyl or phenyl.

It is preferred that R⁵¹ is hydrogen, C₁₋₁₀ alkyl, C₁₋₆ alkylcarbonyloxy(C₁₋₆)alkyl, benzoyloxymethyl (where the phenyl ring may be optionally substituted with halogen or C₁₋₄ alkyl), C₁₋₆ alkoxy(C₁₋₆)alkyl (where the alkyl group may be optionally substituted by aryl or C₁₋₄ alkoxycarbonyl), C₂₋₆ alkenyloxy(C₁₋₄)alkyl, C₂₋₆ alkynyloxy(C₁₋₄)alkyl, benzyloxy-

(C₁₋₄)alkyl (where the phenyl ring may be optionally substituted with halogen or C₁₋₄ alkyl), C₃₋₇ cycloalkyl(C₁₋₄)alkyl, heteroaryl(C₁₋₃)alkyl (where the heteroaryl group may be optionally substituted with halogen), tri(C₁₋₄)alkylsilyl(C₁₋₆)alkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl (especially allyl), C₂₋₆ haloalkenyl(C₁₋₆)alkyl, C₁₋₄ alkoxycarbonyl(C₂₋₆)alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, tri(C₁₋₄)alkylsilyl(C₂₋₆)alkynyl(C₁₋₆)alkyl or C₁₋₁₀ alkylcarbonyl.

It is more preferred that R⁵¹ is hydrogen, C₁₋₆ alkyl, C₁₋₆ alkylcarbonyloxymethyl, benzyloxymethyl (where the phenyl ring may be optionally substituted with halogen or C₁₋₄ alkyl), C₁₋₆ alkoxymethyl, C₂₋₆ alkenyloxymethyl, C₂₋₆ alkynyloxymethyl, benzyloxymethyl (where the phenyl ring may be optionally substituted with halogen or C₁₋₄ alkyl), C₂₋₆ alkynyl(C₁₋₆)alkyl (especially propargyl) or C₁₋₁₀ alkylcarbonyl.

Even more preferably R⁵¹ is hydrogen, C₁₋₆ alkyl, C₁₋₆ alkylcarbonyloxymethyl, C₁₋₆ alkoxymethyl, benzyloxymethyl or benzoyloxymethyl.

Yet more preferably R⁵¹ is hydrogen, C₁₋₄ alkyl, C₁₋₄ alkoxy (C₁₋₄)alkyl, benzyloxymethyl or benzoyloxymethyl; or is C₁₋₆ alkylcarbonyloxymethyl

Most preferably R⁵¹ is hydrogen, C₁₋₄ alkyl, C₁₋₆ alkylcarbonyloxymethyl or C₁₋₄ alkoxymethyl.

Preferably R⁵² and R⁵³ are independently C₁₋₁₀ alkyl, C₁₋₁₀ haloalkyl, C₂₋₆ alkenyl-(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, C₃₋₇ cycloalkyl, C₁₋₆ alkylamino, di(C₁₋₆)alkylamino, phenyl(C₁₋₄)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy),

Even more preferably R⁵² and R⁵³ are independently C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₂₋₆ alkenyl(C₁₋₆)alkyl, C₂₋₆ alkynyl(C₁₋₆)alkyl, benzyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy).

R¹ is preferably hydrogen, halogen, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₃₋₇ cycloalkyl(C₁₋₄)alkyl, C₁₋₆ cyanoalkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₃₋₆ cycloalkyl, cyano, nitro or SF₅.

More preferably R¹ is hydrogen, halogen, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₃₋₆ cycloalkyl, cyano, nitro or SF₅.

Even more preferably R¹ is hydrogen, halogen, C₁₋₆ alkyl, C₂₋₆ alkenyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₃₋₆ cycloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, cyano or nitro.

Most preferably R¹ is halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy.

Preferably R³, R⁴ and R⁵ are, independently, hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl, cyano, nitro, C₁₋₆ alkylcarbonyl, or C₁₋₆ alkoxy carbonyl..

More preferably R³, R⁴ and R⁵ are independently hydrogen, C₁₋₃ alkyl or halogen.

Most preferably R³, R⁴ and R⁵ are independently, hydrogen, or halogen (especially fluorine) but most preferably each is hydrogen.

R⁶ is preferably C₁₋₈ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₂₋₆ alkenyl, C₂₋₆ alkynyl, C₃₋₇ cycloalkyl, C₃₋₇ halocycloalkyl, C₃₋₇ cyanocycloalkyl, C₁₋₃ alkyl(C₃₋₇)cycloalkyl, C₁₋₃ alkyl(C₃₋₇)halocycloalkyl, C₅₋₆ cycloalkenyl, C₃₋₇ cycloalkyl(C₁₋₆)alkyl, C₅₋₆ cycloalkenyl(C₁₋₆)alkyl, C₂₋₆ haloalkenyl, C₁₋₆ cyanoalkenyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₃₋₆ alkenyloxy(C₁₋₆)alkyl, C₃₋₆ alkynyloxy(C₁₋₆)alkyl, aryloxy(C₁₋₆)alkyl, C₁₋₆ carboxyalkyl, C₁₋₆ alkylcarbonyl(C₁₋₆)alkyl, C₂₋₆ alkenylcarbonyl(C₁₋₆)alkyl, C₂₋₆ alkynylcarbonyl(C₁₋₆)alkyl, C₁₋₆ alkoxy carbonyl(C₁₋₆)alkyl, C₃₋₆ alkenyloxy carbonyl(C₁₋₆)alkyl, C₃₋₆ alkynyloxy carbonyl(C₁₋₆)alkyl, aryloxy carbonyl(C₁₋₆)alkyl, C₁₋₆ alkylthio(C₁₋₆)alkyl, C₁₋₆ alkylsulfinyl(C₁₋₆)alkyl, C₁₋₆ alkylsulfonyl(C₁₋₆)alkyl, aminocarbonyl(C₁₋₆)alkyl, aminocarbonyl(C₂₋₆)alkenyl, aminocarbonyl(C₂₋₆)alkynyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkyl, di(C₁₋₆)alkylamino carbonyl(C₁₋₆)alkyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkenyl, di(C₁₋₆)alkylaminocarbonyl(C₁₋₆)alkenyl, alkylaminocarbonyl(C₁₋₆)alkynyl, di(C₁₋₆)alkylaminocarbonyl(C₁₋₆)alkynyl, phenyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), phenyl(C₁₋₄)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), phenyl-(C₂₋₄)alkenyl, (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl (wherein the heterocyclyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl(C₁₋₄)alkyl (wherein the heteroaryl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl(C₁₋₄)alkyl (wherein the heterocyclyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), R²⁶O, C₁₋₈ alkylthio, R²⁸R²⁹N or R³¹ON=C(R²⁷); where R²⁶ is C₁₋₈ alkyl, C₁₋₆ haloalkyl; R²⁷

is C₁₋₆ alkyl, C₁₋₆ haloalkyl or phenyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy); R²⁷ is C₁₋₆ alkyl, C₁₋₆ haloalkyl or phenyl (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy); R²⁸ and R²⁹ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl, C₃₋₆ alkenyl, C₃₋₆ alkynyl, C₃₋₇ cycloalkyl(C₁₋₄)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl, or R²⁸ and R²⁹ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups; and R³¹ is C₁₋₆ alkyl or phenyl(C₁₋₂)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy).

More preferably R⁶ is C₁₋₈ alkyl, C₁₋₈ haloalkyl, C₁₋₈ cyanoalkyl, C₃₋₇ cycloalkyl-(C₁₋₆)alkyl, C₅₋₆ cycloalkenyl(C₁₋₆)alkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₃₋₆ alkenyloxy(C₁₋₆)alkyl, C₃₋₆ alkynyloxy(C₁₋₆)alkyl, aryloxy(C₁₋₆)alkyl, C₁₋₆ carboxyalkyl, C₁₋₆ alkylcarbonyl-(C₁₋₆)alkyl, C₂₋₆ alkenylcarbonyl(C₁₋₆)alkyl, C₂₋₆ alkynylcarbonyl(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl(C₁₋₆)alkyl, C₃₋₆ alkenyloxycarbonyl(C₁₋₆)alkyl, C₃₋₆ alkynyloxycarbonyl-(C₁₋₆)alkyl, aryloxycarbonyl(C₁₋₆)alkyl, C₁₋₆ alkylthio(C₁₋₆)alkyl, C₁₋₆ alkylsulfinyl(C₁₋₆)alkyl, C₁₋₆ alkylsulfonyl(C₁₋₆)alkyl, aminocarbonyl(C₁₋₆)alkyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkyl, di(C₁₋₆)alkylaminocarbonyl(C₁₋₆)alkyl, phenyl(C₁₋₄)alkyl (wherein the phenyl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl(C₁₋₄)alkyl (wherein the heteroaryl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heterocyclyl(C₁₋₄)alkyl (wherein the heterocyclyl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₂₋₆ alkenyl, C₂₋₆ haloalkenyl, C₁₋₆ cyanoalkenyl, C₅₋₆ cycloalkenyl, aminocarbonyl(C₂₋₆)alkenyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkenyl, di(C₁₋₆)alkylaminocarbonyl(C₁₋₆)alkenyl, phenyl-(C₂₋₄)alkenyl, (wherein the phenyl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₂₋₆ alkynyl, aminocarbonyl-(C₂₋₆)alkynyl, alkylaminocarbonyl(C₁₋₆)alkynyl, di(C₁₋₆)alkylaminocarbonyl(C₁₋₆)alkynyl, C₃₋₇ cycloalkyl, C₃₋₇ halocycloalkyl, C₃₋₇ cyanocycloalkyl, C₁₋₃ alkyl(C₃₋₇)cycloalkyl, C₁₋₃ alkyl(C₃₋₇)halocycloalkyl, phenyl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), heteroaryl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy).

haloalkoxy), heterocyclyl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₁₋₈ alkylthio, R²⁶O, R²⁸R²⁹N or R³¹ON=C(R²⁷); where R²⁶ is C₁₋₈ alkyl or C₁₋₆ haloalkyl; R²⁷ is phenyl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₁₋₆ alkyl or C₁₋₆ haloalkyl; R²⁸ and R²⁹ are, independently, hydrogen, C₁₋₈ alkyl, C₃₋₇ cycloalkyl(C₁₋₄)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₃₋₇ cycloalkyl, C₃₋₆ alkenyl, C₃₋₆ alkynyl or C₁₋₆ alkoxycarbonyl; and R³¹ is phenyl(C₁₋₂)alkyl (wherein the phenyl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or C₁₋₆ alkyl.

Even more preferably R⁶ is C₁₋₈ alkyl, C₁₋₈ haloalkyl, C₁₋₈ cyanoalkyl, C₃₋₇ cycloalkyl, C₁₋₃ alkyl (C₃₋₇) cycloalkyl, C₁₋₆ alkoxy (C₁₋₆) alkyl, heterocyclic (optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or R²⁸R²⁹N where R²⁸ and R²⁹ are independently C₁₋₈ alkyl or together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups.

Most preferably R⁶ is C₁₋₈ alkyl, C₁₋₈ haloalkyl, C₁₋₈ cyanoalkyl, C₁₋₆ alkoxy (C₁₋₆) alkyl, C₃₋₇ cycloalkyl, C₁₋₃ alkyl (C₃₋₇) cycloalkyl, heterocyclyl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or di(C₁₋₈)alkylamino.

Preferably R¹² is hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy (C₁₋₆)alkyl, C₂₋₆ alkenyl, C₁₋₆ alkynyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl, cyano, nitro, formyl, C₁₋₆ alkylcarbonyl, C₁₋₆ alkoxycarbonyl, CH=NOR³², or R¹ and R¹² together with the atoms to which they are attached may be joined to form a five, six or seven-membered saturated or unsaturated, carbocyclic or heterocyclic ring which may contain one or two heteroatoms selected from O, N or S and which may be optionally substituted by C₁₋₆ alkyl, C₁₋₆ haloalkyl or halogen; and R³² is phenyl(C₁₋₂)alkyl (wherein the phenyl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or C₁₋₆ alkyl.

More preferably R¹² is hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy (C₁₋₆)alkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, C₁₋₆ alkylthio, or R¹ and R¹² together with the atoms

to which they are attached form a cyclopentane or benzene ring optionally substituted by C₁₋₆ alkyl, C₁₋₆ haloalkyl or halogen.

Most preferably R¹² is hydrogen, halogen, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy-(C₁₋₆)alkyl, C₁₋₆ alkoxy, C₁₋₆ haloalkoxy, or R¹ and R¹² together with the atoms to which they
 5 are attached form a cyclopentane ring optionally substituted by C₁₋₆ alkyl, C₁₋₆ haloalkyl or halogen;

R¹³ is preferably cyano, nitro, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₃₋₇ cycloalkyl(C₁₋₆)alkyl, C₃₋₇ cycloalkyl, CH₂(C₂₋₆)alkenyl, CH₂(C₂₋₆)alkynyl, phenyl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy),
 10 heteroaryl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₁₋₆ alkylcarbonyl, C₁₋₆ alkoxy carbonyl, C₁₋₆ alkylamino, di(C₁₋₆)alkylamino, C₁₋₆ alkylcarbonylamino, C₁₋₆ alkoxy carbonylamino, C₁₋₆ alkoxy, C₁₋₆ alkylthio, C₁₋₆ haloalkylthio, C₁₋₆ alkylsulfinyl, C₁₋₆ haloalkylsulfinyl, C₁₋₆ alkylsulfonyl, C₁₋₆ haloalkylsulfonyl, arylthio, arylsulfinyl, arylsulfonyl or
 15 (C₁₋₆)alkylcarbonyloxy.

Preferably R¹⁴ is hydrogen, C₁₋₈ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₂₋₆ alkenyl, C₂₋₆ haloalkenyl, C₂₋₆ alkynyl, C₃₋₇ cycloalkyl, C₃₋₇ cycloalkyl(C₁₋₆)alkyl, C₁₋₆ alkoxy-(C₁₋₆)alkyl, C₁₋₆ alkoxy carbonyl, C₁₋₆ alkylcarbonyl, C₁₋₆ alkylaminocarbonyl, di(C₁₋₆)alkylaminocarbonyl, phenyl (which may be optionally substituted by halo, nitro,
 20 cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or heteroaryl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy).

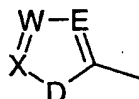
More preferably R¹⁴ is hydrogen, C₁₋₈ alkyl or C₁₋₆ haloalkyl.

Preferably R¹⁸ is hydrogen, halogen, nitro, cyano, C₁₋₈ alkyl, C₁₋₆ haloalkyl, C₁₋₆ cyanoalkyl, C₃₋₇ cycloalkyl(C₁₋₆)alkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxy carbonyl(C₁₋₆)alkyl, C₁₋₆ alkylcarbonyl(C₁₋₆)alkyl, C₁₋₆ alkylaminocarbonyl(C₁₋₆)alkyl, di(C₁₋₆)alkylamino-carbonyl(C₁₋₆)alkyl, phenyl(C₁₋₆)alkyl (wherein the phenyl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy),
 25 heteroaryl(C₁₋₆)alkyl (wherein the heteroaryl group may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy), C₂₋₆ alkenyl, C₂₋₆ haloalkenyl, C₂₋₆ alkynyl, C₃₋₇ cycloalkyl, C₁₋₆ alkoxy carbonyl, C₁₋₆ alkylcarbonyl, C₁₋₆ alkylaminocarbonyl, di(C₁₋₆)alkylaminocarbonyl, phenyl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy) or
 30

heteroaryl (which may be optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy).

More preferably R¹⁸ is hydrogen, halogen, C₁₋₈ alkyl or C₁₋₆ haloalkyl.

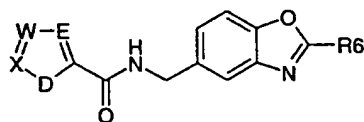
More preferred optionally substituted rings of formula



include pyrazoles, 2,4,5,6-tetrahydro-cyclopentapyrazoles, 4,5,6,7-tetrahydro-[2H]-indazoles and indazoles which may be optionally substituted by substituents chosen from

- halo, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy, C₁₋₆ alkoxy(C₁₋₆)alkyl or C₁₋₆ haloalkoxy. Even more preferably the rings include 5-linked 1-methyl-[1H]-pyrazoles optionally substituted at the 3-position with C₁₋₆ alkyl, haloalkyl or alkoxyalkyl and at the 4-position with halo or alkoxy; 3-linked 2,4,5,6-tetrahydro-2-methylcyclopentapyrazoles optionally substituted at the 6-position with alkyl (especially methyl), haloalkyl or halo; 3-linked 4,5,6,7-tetrahydro-2-methyl-[2H]-indazoles optionally substituted at the 7-position with alkyl (especially methyl), haloalkyl or halo and 3-linked 2-methyl-[2H]-indazoles optionally substituted at the 7-position with alkyl, haloalkyl or halo (especially fluoro).

The compounds in the following Tables illustrate compounds of the invention. Table 1 provides compounds of formula (I') wherein A is CH₂, M is CONH, Z is O, B is N, R³, R⁴ and R⁵ are each hydrogen; and, D, E, W, X and R⁶ are as defined in the Table.



wherein D, E, W, X and R₆ are as defined in Table 1.

TABLE 1

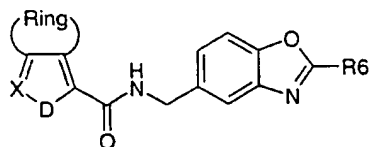
Cpd No.	D	E	W	X	R ₆
1	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
2	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
3	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
4	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂

5	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
6	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
7	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
8	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
9	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
10	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
11	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₃
12	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
13	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
14	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
15	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
16	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
17	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
18	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
19	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
20	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
21	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₃
22	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CH ₃
23	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CH ₂ CH ₃
24	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH(CH ₃) ₂
25	N(CH ₃)	C(Cl)	C(CH ₃)	N	C(CH ₃) ₃
26	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CH(CH ₃) ₂
27	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ C(CH ₃) ₃
28	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CF ₃
29	N(CH ₃)	C(Cl)	C(CH ₃)	N	CF ₂ CF ₃
30	N(CH ₃)	C(Cl)	C(CH ₃)	N	CF ₂ CF ₂ CF ₃
31	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₃
32	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
33	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
34	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
35	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
36	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
37	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
38	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
39	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
40	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
41	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
42	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
43	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
44	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
45	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
46	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
47	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
48	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
49	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
50	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
51	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃

52	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
53	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
54	S	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
55	S	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
56	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
57	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
58	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
59	S	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
60	S	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
61	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₃
62	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
63	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
64	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
65	S	C(CH ₃)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
66	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
67	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
68	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
69	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
70	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
71	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
72	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
73	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
74	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
75	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
76	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
77	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
78	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
79	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
80	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
81	S	N	C(CH ₃)	N	CH ₃
82	S	N	C(CH ₃)	N	CH ₂ CH ₃
83	S	N	C(CH ₃)	N	CH ₂ CH ₂ CH ₃
84	S	N	C(CH ₃)	N	CH(CH ₃) ₂
85	S	N	C(CH ₃)	N	C(CH ₃) ₃
86	S	N	C(CH ₃)	N	CH ₂ CH(CH ₃) ₂
87	S	N	C(CH ₃)	N	CH ₂ C(CH ₃) ₃
88	S	N	C(CH ₃)	N	CH ₂ CF ₃
89	S	N	C(CH ₃)	N	CF ₂ CF ₃
90	S	N	C(CH ₃)	N	CF ₂ CF ₂ CF ₃
91	N(CH ₃)	C(H)	N	C(CH ₃)	CH ₃
92	N(CH ₃)	C(H)	N	C(CH ₃)	CH ₂ CH ₃
93	N(CH ₃)	C(H)	N	C(CH ₃)	CH ₂ CH ₂ CH ₃
94	N(CH ₃)	C(H)	N	C(CH ₃)	CH(CH ₃) ₂
95	N(CH ₃)	C(H)	N	C(CH ₃)	C(CH ₃) ₃
96	N(CH ₃)	C(H)	N	C(CH ₃)	CH ₂ CH(CH ₃) ₂
97	N(CH ₃)	C(H)	N	C(CH ₃)	CH ₂ C(CH ₃) ₃
98	N(CH ₃)	C(H)	N	C(CH ₃)	CH ₂ CF ₃

99	N(CH ₃)	C(H)	N	C(CH ₃)	CF ₂ CF ₃
100	N(CH ₃)	C(H)	N	C(CH ₃)	CF ₂ CF ₂ CF ₃
101	CH=CH	C(H)	C(Cl)	N	CH ₃
102	CH=CH	C(H)	C(Cl)	N	CH ₂ CH ₃
103	CH=CH	C(H)	C(Cl)	N	CH ₂ CH ₂ CH ₃
104	CH=CH	C(H)	C(Cl)	N	CH(CH ₃) ₂
105	CH=CH	C(H)	C(Cl)	N	C(CH ₃) ₃
106	CH=CH	C(H)	C(Cl)	N	CH ₂ CH(CH ₃) ₂
107	CH=CH	C(H)	C(Cl)	N	CH ₂ C(CH ₃) ₃
108	CH=CH	C(H)	C(Cl)	N	CH ₂ CF ₃
109	CH=CH	C(H)	C(Cl)	N	CF ₂ CF ₃
110	CH=CH	C(H)	C(Cl)	N	CF ₂ CF ₂ CF ₃
111	S	C(CH ₃)	N	C(CH ₃)	CH ₃
112	S	C(CH ₃)	N	C(CH ₃)	CH ₂ CH ₃
113	S	C(CH ₃)	N	C(CH ₃)	CH ₂ CH ₂ CH ₃
114	S	C(CH ₃)	N	C(CH ₃)	CH(CH ₃) ₂
115	S	C(CH ₃)	N	C(CH ₃)	C(CH ₃) ₃
116	S	C(CH ₃)	N	C(CH ₃)	CH ₂ CH(CH ₃) ₂
117	S	C(CH ₃)	N	C(CH ₃)	CH ₂ C(CH ₃) ₃
118	S	C(CH ₃)	N	C(CH ₃)	CH ₂ CF ₃
119	S	C(CH ₃)	N	C(CH ₃)	CF ₂ CF ₃
120	S	C(CH ₃)	N	C(CH ₃)	CF ₂ CF ₂ CF ₃
121	N(CH ₃)	C(H)	C(CH ₃)	N	CH ₃
122	N(CH ₃)	C(H)	C(CH ₃)	N	CH ₂ CH ₃
123	N(CH ₃)	C(H)	C(CH ₃)	N	CH ₂ CH ₂ CH ₃
124	N(CH ₃)	C(H)	C(CH ₃)	N	CH(CH ₃) ₂
125	N(CH ₃)	C(H)	C(CH ₃)	N	C(CH ₃) ₃
126	N(CH ₃)	C(H)	C(CH ₃)	N	CH ₂ CH(CH ₃) ₂
127	N(CH ₃)	C(H)	C(CH ₃)	N	CH ₂ C(CH ₃) ₃
128	N(CH ₃)	C(H)	C(CH ₃)	N	CH ₂ CF ₃
129	N(CH ₃)	C(H)	C(CH ₃)	N	CF ₂ CF ₃
130	N(CH ₃)	C(H)	C(CH ₃)	N	CF ₂ CF ₂ CF ₃
131	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH ₃
132	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH ₂ CH ₃
133	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH ₂ CH ₂ CH ₃
134	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH(CH ₃) ₂
135	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	C(CH ₃) ₃
136	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH ₂ CH(CH ₃) ₂
137	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH ₂ C(CH ₃) ₃
138	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CH ₂ CF ₃
139	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CF ₂ CF ₃
140	N(CH ₃)	C(H)	C(C(CH ₃) ₃)	N	CF ₂ CF ₂ CF ₃

Table 2 provides 70 compounds of formula

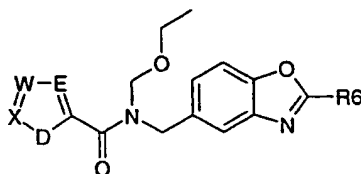


wherein X, D, R6 and "Ring" are as defined in Table 2

Cpd No.	X	D	Ring	R6
1	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₃
2	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₃
3	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
4	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH(CH ₃) ₂
5	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	C(CH ₃) ₃
6	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
7	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
8	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CF ₃
9	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₃
10	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
11	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₃
12	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CH ₃
13	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
14	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH(CH ₃) ₂
15	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	C(CH ₃) ₃
16	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
17	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
18	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CF ₃
19	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CF ₂ CF ₃
20	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
21	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₃
22	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CH ₃
23	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
24	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH(CH ₃) ₂
25	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	C(CH ₃) ₃
26	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
27	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
28	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CF ₃
29	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CF ₂ CF ₃
30	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
31	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₃
32	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₃
33	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
34	N	S	-CH ₂ CH ₂ CH ₂ -	CH(CH ₃) ₂
35	N	S	-CH ₂ CH ₂ CH ₂ -	C(CH ₃) ₃
36	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
37	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
38	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CF ₃

39	N	S	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₃
40	N	S	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
41	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₃
42	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CH ₃
43	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CH ₂ CH ₃
44	N	N(CH ₃)	-CH=CH-CH=CH-	CH(CH ₃) ₂
45	N	N(CH ₃)	-CH=CH-CH=CH-	C(CH ₃) ₃
46	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CH(CH ₃) ₂
47	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ C(CH ₃) ₃
48	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CF ₃
49	N	N(CH ₃)	-CH=CH-CH=CH-	CF ₂ CF ₃
50	N	N(CH ₃)	-CH=CH-CH=CH-	CF ₂ CF ₂ CF ₃
51	N	CH=CH	-CF=CH-CH=CH-	CH ₃
52	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CH ₃
53	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CH ₂ CH ₃
54	N	CH=CH	-CF=CH-CH=CH-	CH(CH ₃) ₂
55	N	CH=CH	-CF=CH-CH=CH-	C(CH ₃) ₃
56	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CH(CH ₃) ₂
57	N	CH=CH	-CF=CH-CH=CH-	CH ₂ C(CH ₃) ₃
58	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CF ₃
59	N	CH=CH	-CF=CH-CH=CH-	CF ₂ CF ₃
60	N	CH=CH	-CF=CH-CH=CH-	CF ₂ CF ₂ CF ₃
61	N	CH=CH	-CH=CH-CH=CH-	CH ₃
62	N	CH=CH	-CH=CH-CH=CH-	CH ₂ CH ₃
63	N	CH=CH	-CH=CH-CH=CH-	CH ₂ CH ₂ CH ₃
64	N	CH=CH	-CH=CH-CH=CH-	CH(CH ₃) ₂
65	N	CH=CH	-CH=CH-CH=CH-	C(CH ₃) ₃
66	N	CH=CH	-CH=CH-CH=CH-	CH ₂ CH(CH ₃) ₂
67	N	CH=CH	-CH=CH-CH=CH-	CH ₂ C(CH ₃) ₃
68	N	CH=CH	-CH=CH-CH=CH-	CH ₂ CF ₃
69	N	CH=CH	-CH=CH-CH=CH-	CF ₂ CF ₃
70	N	CH=CH	-CH=CH-CH=CH-	CF ₂ CF ₂ CF ₃

Table 3 provides 80 compounds of formula



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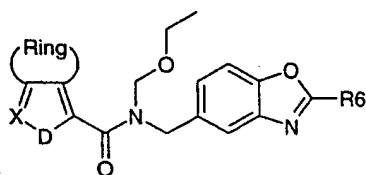
wherein D, E, W, X and R6 are as defined in Table 3

Cpd No.	D	E	W	X	R6
1	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
2	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃

3	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
4	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
5	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
6	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
7	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
8	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
9	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
10	N(CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
11	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₃
12	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
13	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
14	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
15	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
16	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
17	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
18	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
19	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
20	N(CH ₃)	C(OCH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
21	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₃
22	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CH ₃
23	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CH ₂ CH ₃
24	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH(CH ₃) ₂
25	N(CH ₃)	C(Cl)	C(CH ₃)	N	C(CH ₃) ₃
26	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CH(CH ₃) ₂
27	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ C(CH ₃) ₃
28	N(CH ₃)	C(Cl)	C(CH ₃)	N	CH ₂ CF ₃
29	N(CH ₃)	C(Cl)	C(CH ₃)	N	CF ₂ CF ₃
30	N(CH ₃)	C(Cl)	C(CH ₃)	N	CF ₂ CF ₂ CF ₃
31	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₃
32	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
33	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
34	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
35	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
36	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
37	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
38	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
39	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
40	N(CH ₃)	C(Br)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
41	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
42	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
43	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
44	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
45	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
46	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
47	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
48	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
49	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃

50	N(CH ₂ CH ₃)	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
51	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
52	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
53	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
54	S	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
55	S	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
56	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
57	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
58	S	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
59	S	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
60	S	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
61	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₃
62	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
63	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
64	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
65	S	C(CH ₃)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
66	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
67	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
68	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
69	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
70	S	C(CH ₃)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃
71	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₃
72	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₃
73	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH ₂ CH ₃
74	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH(CH ₃) ₂
75	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	C(CH ₃) ₃
76	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CH(CH ₃) ₂
77	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ C(CH ₃) ₃
78	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CH ₂ CF ₃
79	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₃
80	CH=CH	C(Cl)	C(CH ₂ CH ₃)	N	CF ₂ CF ₂ CF ₃

Table 4 provides 60 compounds of formula



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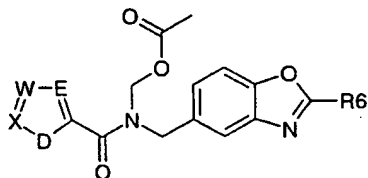
wherein X, D, R6 and "Ring" are as defined in Table 4

Cpd No.	X	D	Ring	R6
1	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₃
2	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₃
3	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃

4	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH(CH ₃) ₂
5	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	C(CH ₃) ₃
6	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
7	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
8	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CH ₂ CF ₃
9	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₃
10	N	N(CH ₃)	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
11	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₃
12	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CH ₃
13	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
14	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH(CH ₃) ₂
15	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	C(CH ₃) ₃
16	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
17	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
18	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CH ₂ CF ₃
19	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CF ₂ CF ₃
20	N	N(CH ₃)	-CH(CH ₃)CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
21	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₃
22	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CH ₃
23	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
24	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH(CH ₃) ₂
25	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	C(CH ₃) ₃
26	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
27	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
28	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CH ₂ CF ₃
29	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CF ₂ CF ₃
30	N	N(CH ₃)	-CH(CF ₃)CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
31	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₃
32	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₃
33	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH ₂ CH ₃
34	N	S	-CH ₂ CH ₂ CH ₂ -	CH(CH ₃) ₂
35	N	S	-CH ₂ CH ₂ CH ₂ -	C(CH ₃) ₃
36	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CH(CH ₃) ₂
37	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ C(CH ₃) ₃
38	N	S	-CH ₂ CH ₂ CH ₂ -	CH ₂ CF ₃
39	N	S	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₃
40	N	S	-CH ₂ CH ₂ CH ₂ -	CF ₂ CF ₂ CF ₃
41	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₃
42	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CH ₃
43	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CH ₂ CH ₃
44	N	N(CH ₃)	-CH=CH-CH=CH-	CH(CH ₃) ₂
45	N	N(CH ₃)	-CH=CH-CH=CH-	C(CH ₃) ₃
46	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CH(CH ₃) ₂
47	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ C(CH ₃) ₃
48	N	N(CH ₃)	-CH=CH-CH=CH-	CH ₂ CF ₃
49	N	N(CH ₃)	-CH=CH-CH=CH-	CF ₂ CF ₃
50	N	N(CH ₃)	-CH=CH-CH=CH-	CF ₂ CF ₂ CF ₃

51	N	CH=CH	-CF=CH-CH=CH-	CH ₃
52	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CH ₃
53	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CH ₂ CH ₃
54	N	CH=CH	-CF=CH-CH=CH-	CH(CH ₃) ₂
55	N	CH=CH	-CF=CH-CH=CH-	C(CH ₃) ₃
56	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CH(CH ₃) ₂
57	N	CH=CH	-CF=CH-CH=CH-	CH ₂ C(CH ₃) ₃
58	N	CH=CH	-CF=CH-CH=CH-	CH ₂ CF ₃
59	N	CH=CH	-CF=CH-CH=CH-	CF ₂ CF ₃
60	N	CH=CH	-CF=CH-CH=CH-	CF ₂ CF ₂ CF ₃

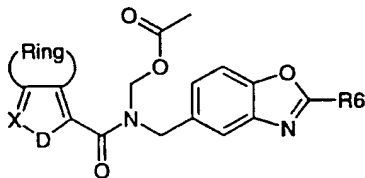
Table 5 provides 80 compounds of formula



5

wherein D, E, W, X and R6 are as defined in Table 3

Table 6 provides 60 compounds of formula

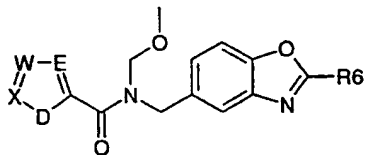


10

wherein X, D, R6 and "Ring" are as defined in Table 4

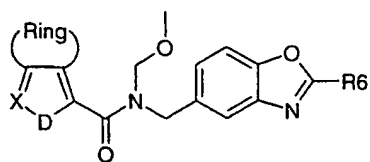
Table 7 provides 80 compounds of formula

15



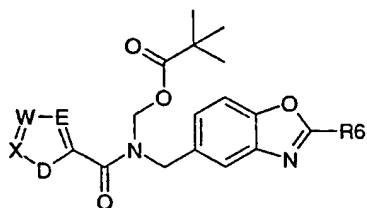
wherein D, E, W, X and R6 are as defined in Table 3

20 Table 8 provides 60 compounds of formula



wherein X, D, R6 and "Ring" are as defined in Table 4

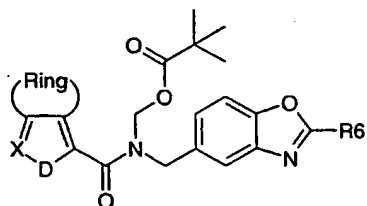
5 Table 9 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

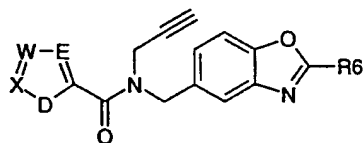
10

Table 10 provides 60 compounds of formula



15 wherein X, D, R6 and "Ring" are as defined in Table 4

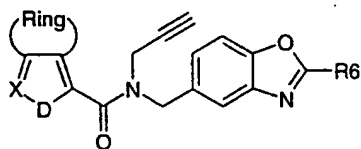
Table 11 provides 80 compounds of formula



20

wherein D, E, W, X and R6 are as defined in Table 3

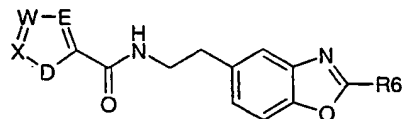
Table 12 provides 60 compounds of formula



25

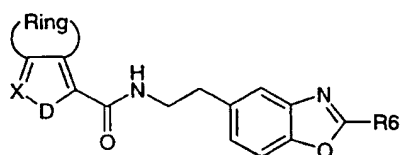
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 13 provides 80 compounds of formula



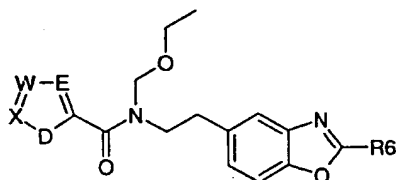
wherein D, E, W, X and R6 are as defined in Table 3

Table 14 provides 60 compounds of formula



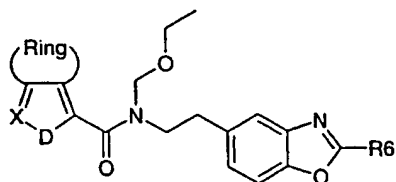
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 15 provides 80 compounds of formula



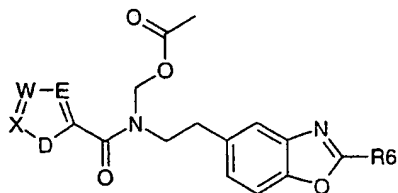
wherein D, E, W, X and R6 are as defined in Table 3

Table 16 provides 60 compounds of formula



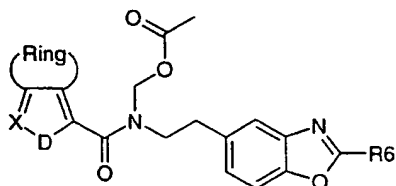
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 17 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

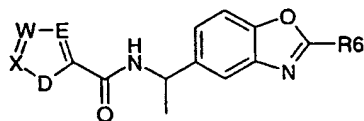
5 Table 18 provides 60 compounds of formula



wherein X, D, R6 and "Ring" are as defined in Table 4

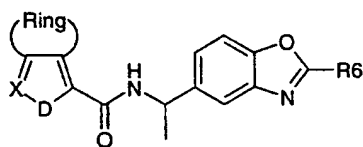
10

Table 19 provides 80 compounds of formula



15 wherein D, E, W, X and R6 are as defined in Table 3

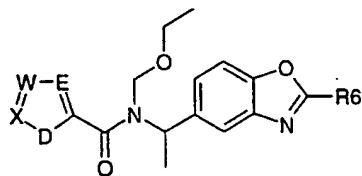
Table 20 provides 60 compounds of formula



20

wherein X, D, R6 and "Ring" are as defined in Table 4

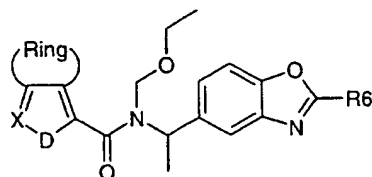
Table 21 provides 80 compounds of formula



25

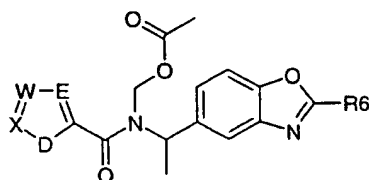
wherein D, E, W, X and R6 are as defined in Table 3

Table 22 provides 60 compounds of formula



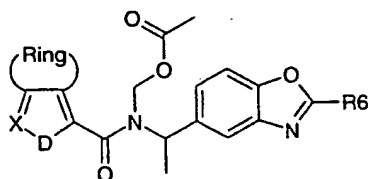
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 23 provides 80 compounds of formula



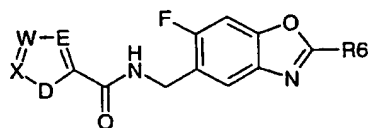
wherein D, E, W, X and R6 are as defined in Table 3

Table 24 provides 60 compounds of formula



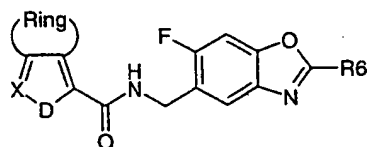
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 25 provides 80 compounds of formula



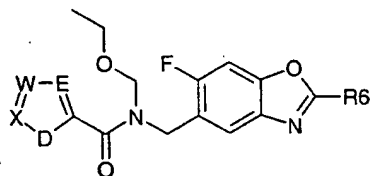
wherein D, E, W, X and R6 are as defined in Table 3

Table 26 provides 60 compounds of formula



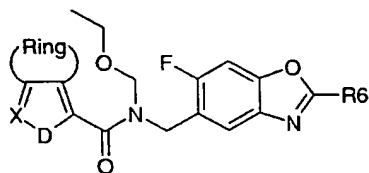
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 27 provides 80 compounds of formula



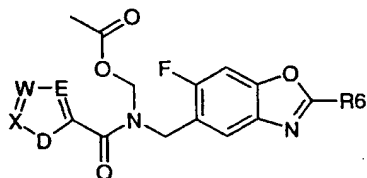
5 wherein D, E, W, X and R6 are as defined in Table 3

Table 28 provides 60 compounds of formula



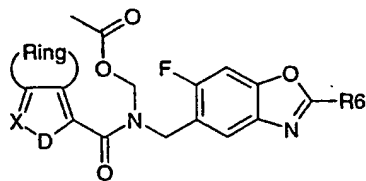
10 wherein X, D, R6 and "Ring" are as defined in Table 4

Table 29 provides 80 compounds of formula



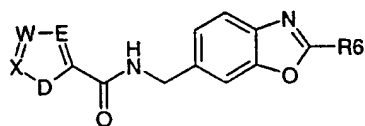
15 wherein D, E, W, X and R6 are as defined in Table 3

Table 30 provides 60 compounds of formula



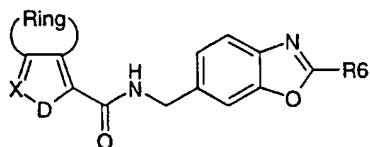
20 wherein X, D, R6 and "Ring" are as defined in Table 4

25 Table 31 provides 80 compounds of formula



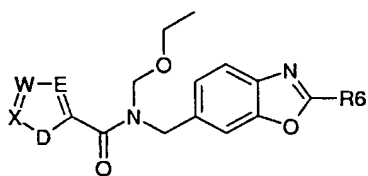
wherein D, E, W, X and R6 are as defined in Table 3

Table 32 provides 60 compounds of formula



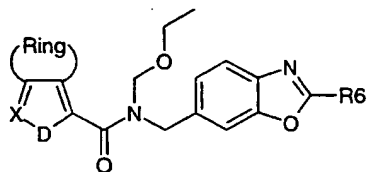
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 33 provides 80 compounds of formula



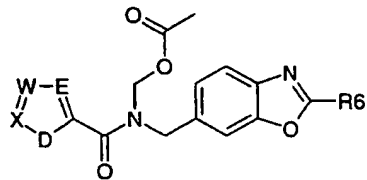
wherein D, E, W, X and R6 are as defined in Table 3

Table 34 provides 60 compounds of formula



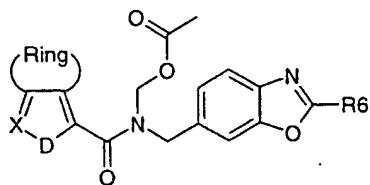
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 35 provides 80 compounds of formula



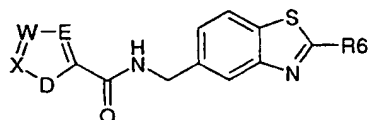
wherein D, E, W, X and R6 are as defined in Table 3

Table 36 provides 60 compounds of formula



wherein X, D, R6 and "Ring" are as defined in Table 4

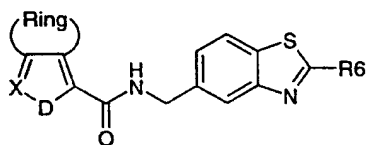
5 Table 37 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

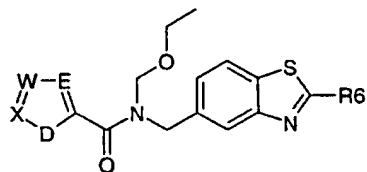
10

Table 38 provides 60 compounds of formula



15 wherein X, D, R6 and "Ring" are as defined in Table 4

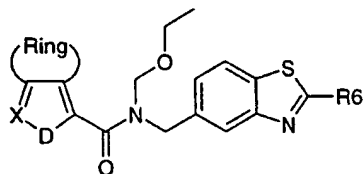
Table 39 provides 80 compounds of formula



20

wherein D, E, W, X and R6 are as defined in Table 3

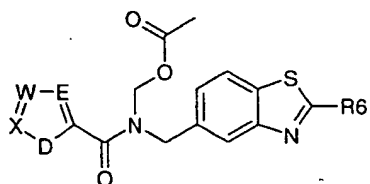
Table 40 provides 60 compounds of formula



25

wherein X, D, R6 and "Ring" are as defined in Table 4

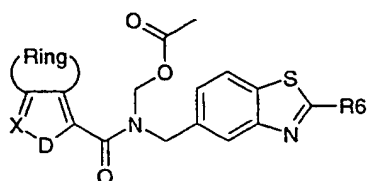
Table 41 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

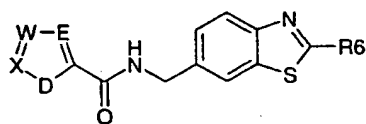
5

Table 42 provides 60 compounds of formula



10 wherein X, D, R6 and "Ring" are as defined in Table 4

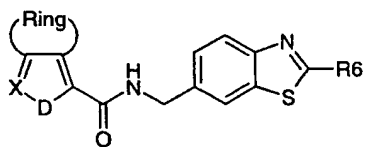
Table 43 provides 80 compounds of formula



15

wherein D, E, W, X and R6 are as defined in Table 3

Table 44 provides 60 compounds of formula

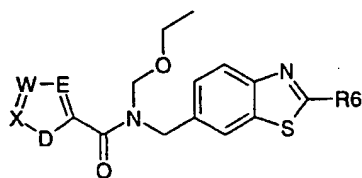


20

wherein X, D, R6 and "Ring" are as defined in Table 4

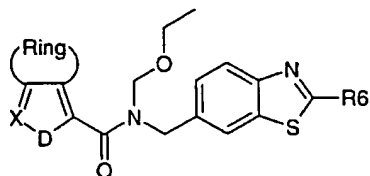
Table 45 provides 80 compounds of formula

25



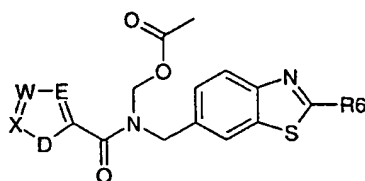
wherein D, E, W, X and R6 are as defined in Table 3

Table 46 provides 60 compounds of formula



5 wherein X, D, R6 and "Ring" are as defined in Table 4

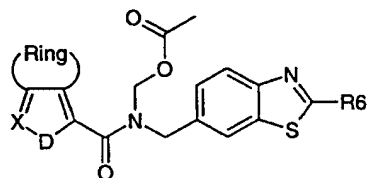
Table 47 provides 80 compounds of formula



10

wherein D, E, W, X and R6 are as defined in Table 3

Table 48 provides 60 compounds of formula

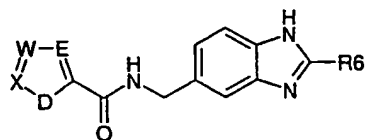


15

wherein X, D, R6 and "Ring" are as defined in Table 4

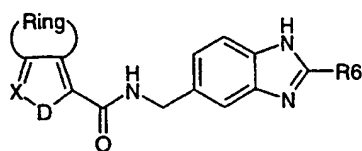
Table 49 provides 80 compounds of formula

20



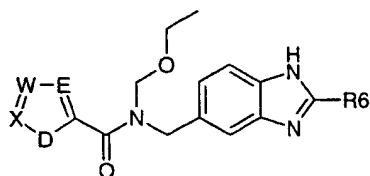
wherein D, E, W, X and R6 are as defined in Table 3

25 Table 50 provides 60 compounds of formula



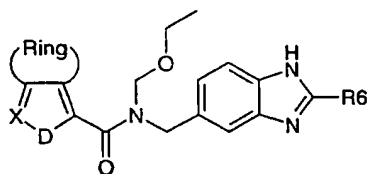
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 51 provides 80 compounds of formula



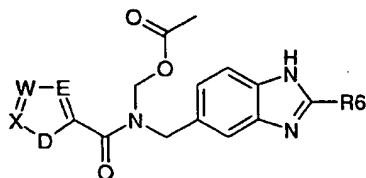
wherein D, E, W, X and R6 are as defined in Table 3

Table 52 provides 60 compounds of formula



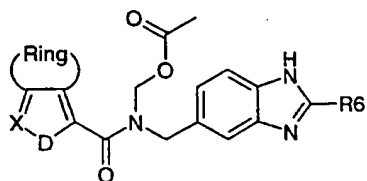
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 53 provides 80 compounds of formula



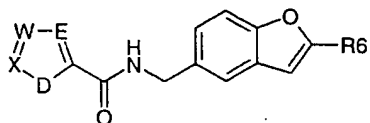
wherein D, E, W, X and R6 are as defined in Table 3

Table 54 provides 60 compounds of formula



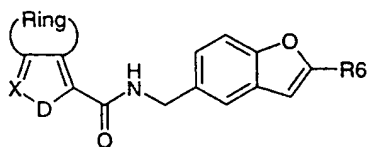
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 55 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

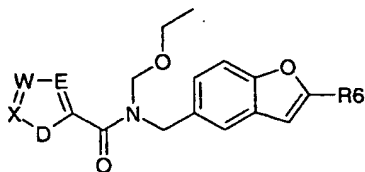
5 Table 56 provides 60 compounds of formula



wherein X, D, R6 and "Ring" are as defined in Table 4

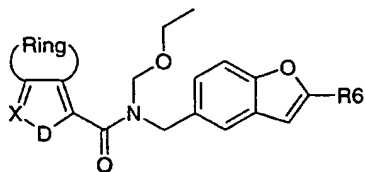
10

Table 57 provides 80 compounds of formula



15 wherein D, E, W, X and R6 are as defined in Table 3

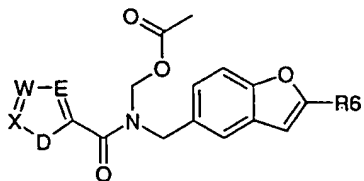
Table 58 provides 60 compounds of formula



20

wherein X, D, R6 and "Ring" are as defined in Table 4

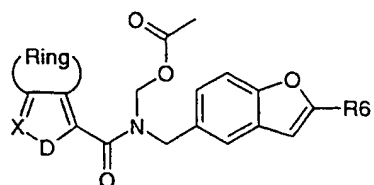
Table 59 provides 80 compounds of formula



25

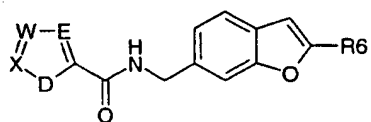
wherein D, E, W, X and R6 are as defined in Table 3

Table 60 provides 60 compounds of formula



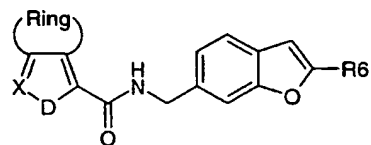
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 61 provides 80 compounds of formula



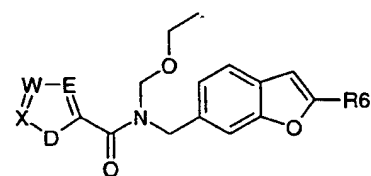
wherein D, E, W, X and R6 are as defined in Table 3

Table 62 provides 60 compounds of formula



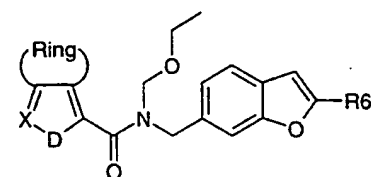
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 63 provides 80 compounds of formula



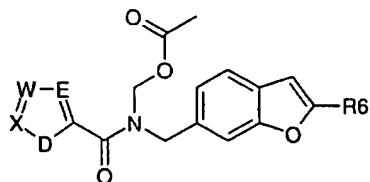
wherein D, E, W, X and R6 are as defined in Table 3

Table 64 provides 60 compounds of formula



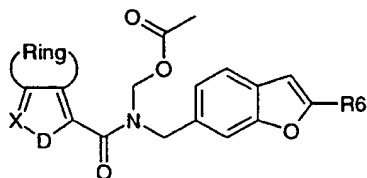
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 65 provides 80 compounds of formula



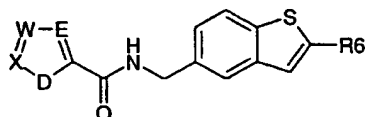
5 wherein D, E, W, X and R6 are as defined in Table 3

Table 66 provides 60 compounds of formula



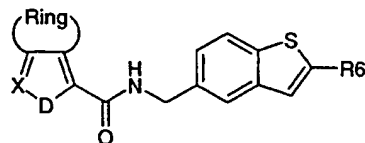
10 wherein X, D, R6 and "Ring" are as defined in Table 4

Table 67 provides 80 compounds of formula



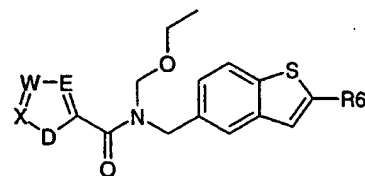
15 wherein D, E, W, X and R6 are as defined in Table 3

Table 68 provides 60 compounds of formula



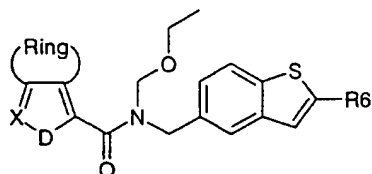
20 wherein X, D, R6 and "Ring" are as defined in Table 4

25 Table 69 provides 80 compounds of formula



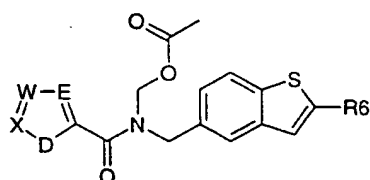
wherein D, E, W, X and R6 are as defined in Table 3

Table 70 provides 60 compounds of formula



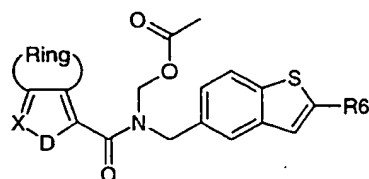
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 71 provides 80 compounds of formula



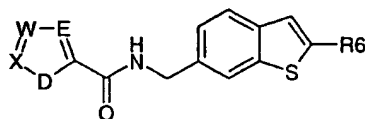
wherein D, E, W, X and R6 are as defined in Table 3

Table 72 provides 60 compounds of formula



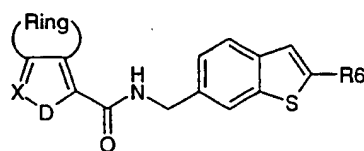
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 73 provides 80 compounds of formula



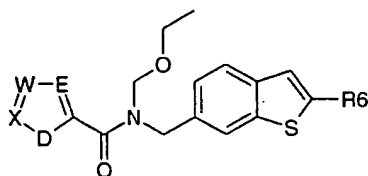
wherein D, E, W, X and R6 are as defined in Table 3

Table 74 provides 60 compounds of formula



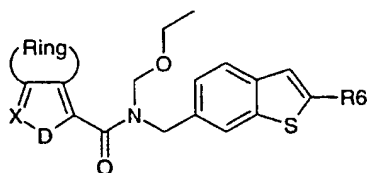
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 75 provides 80 compounds of formula



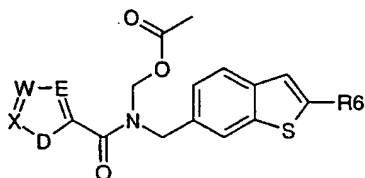
wherein D, E, W, X and R6 are as defined in Table 3

Table 76 provides 60 compounds of formula



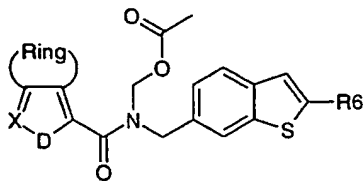
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 77 provides 80 compounds of formula



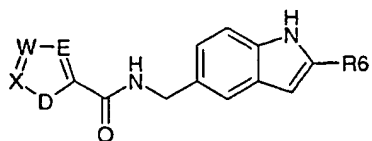
wherein D, E, W, X and R6 are as defined in Table 3

Table 78 provides 60 compounds of formula



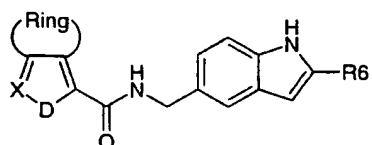
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 79 provides 80 compounds of formula



wherein D, E, W, X and R₆ are as defined in Table 3

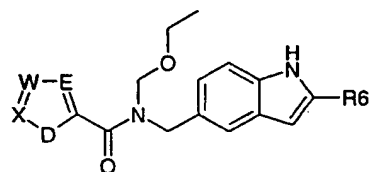
5 Table 80 provides 60 compounds of formula



wherein X, D, R₆ and "Ring" are as defined in Table 4

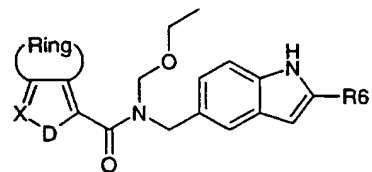
10

Table 81 provides 80 compounds of formula



15 wherein D, E, W, X and R₆ are as defined in Table 3

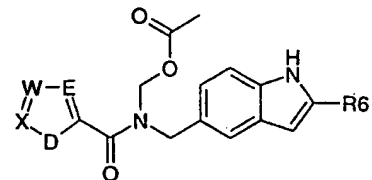
Table 82 provides 60 compounds of formula



20

wherein X, D, R₆ and "Ring" are as defined in Table 4

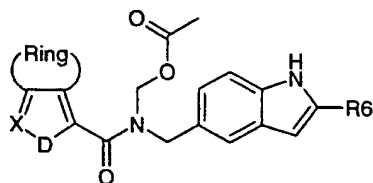
Table 83 provides 80 compounds of formula



25

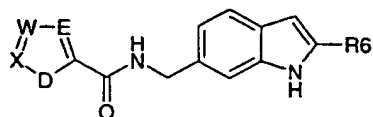
wherein D, E, W, X and R₆ are as defined in Table 3

Table 84 provides 60 compounds of formula



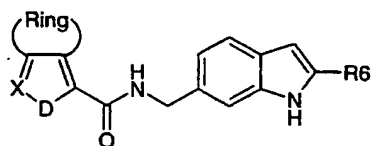
5 wherein X, D, R₆ and "Ring" are as defined in Table 4

Table 85 provides 80 compounds of formula



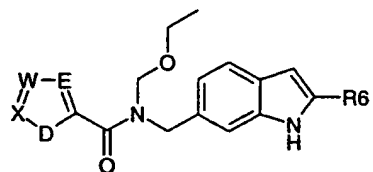
10 wherein D, E, W, X and R₆ are as defined in Table 3

Table 86 provides 60 compounds of formula



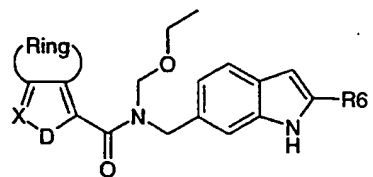
15 wherein X, D, R₆ and "Ring" are as defined in Table 4

Table 87 provides 80 compounds of formula



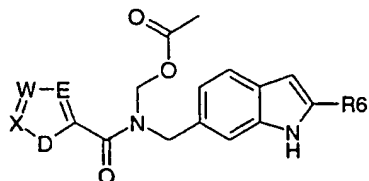
wherein D, E, W, X and R₆ are as defined in Table 3

25 Table 88 provides 60 compounds of formula



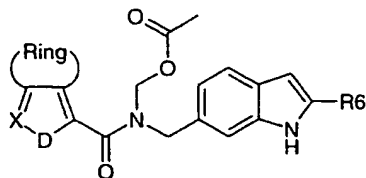
wherein X, D, R₆ and "Ring" are as defined in Table 4

Table 89 provides 80 compounds of formula



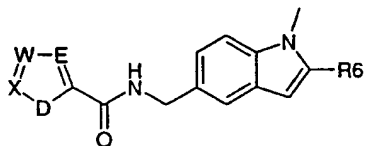
wherein D, E, W, X and R6 are as defined in Table 3

Table 90 provides 60 compounds of formula



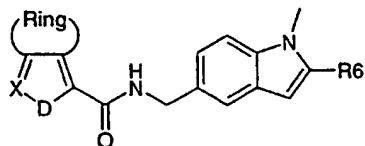
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 91 provides 80 compounds of formula



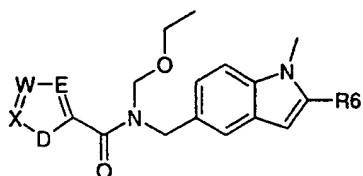
wherein D, E, W, X and R6 are as defined in Table 3

Table 92 provides 60 compounds of formula



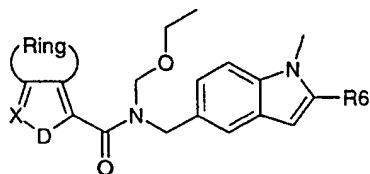
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 93 provides 80 compounds of formula



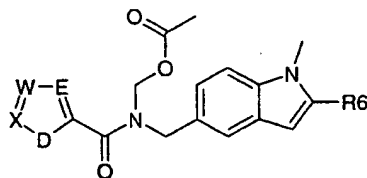
wherein D, E, W, X and R6 are as defined in Table 3

Table 94 provides 60 compounds of formula



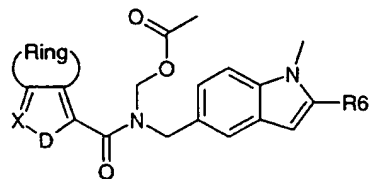
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 95 provides 80 compounds of formula



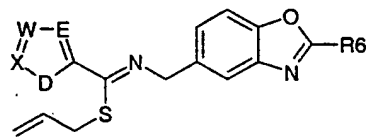
wherein D, E, W, X and R6 are as defined in Table 3

Table 96 provides 60 compounds of formula



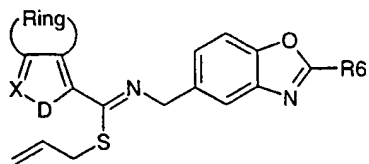
wherein X, D, R6 and "Ring" are as defined in Table 4

Table 97 provides 80 compounds of formula



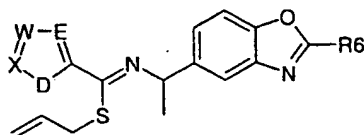
wherein D, E, W, X and R6 are as defined in Table 3

Table 98 provides 60 compounds of formula



wherein X, D, R6 and "Ring" are as defined in Table 4

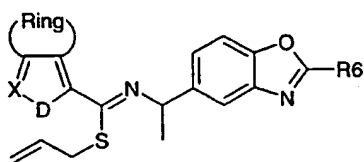
5 Table 99 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

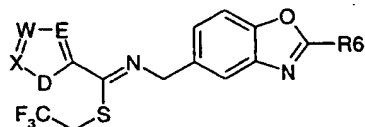
10

Table 100 provides 60 compounds of formula



15 wherein X, D, R6 and "Ring" are as defined in Table 4

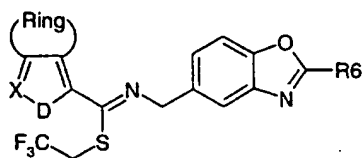
Table 101 provides 80 compounds of formula



20

wherein D, E, W, X and R6 are as defined in Table 3

Table 102 provides 60 compounds of formula

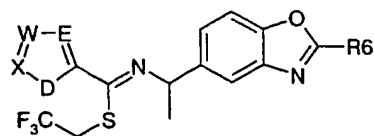


25

wherein X, D, R6 and "Ring" are as defined in Table 4

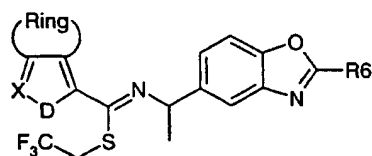
Table 103 provides 80 compounds of formula

30



wherein D, E, W, X and R6 are as defined in Table 3

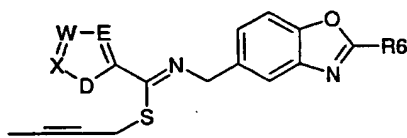
5 Table 104 provides 60 compounds of formula



wherein X, D, R6 and "Ring" are as defined in Table 4

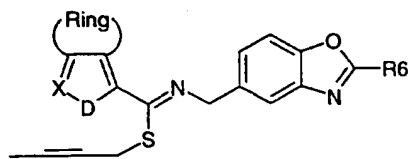
10

Table 105 provides 80 compounds of formula



15 wherein D, E, W, X and R6 are as defined in Table 3

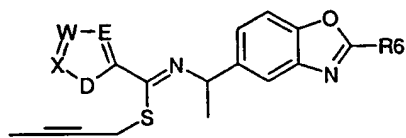
Table 106 provides 60 compounds of formula



20

wherein X, D, R6 and "Ring" are as defined in Table 4

Table 107 provides 80 compounds of formula

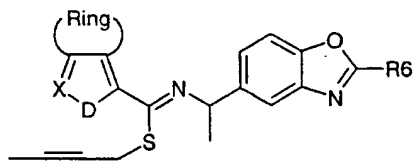


25

wherein D, E, W, X and R6 are as defined in Table 3

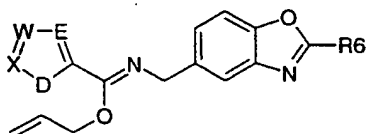
Table 108 provides 60 compounds of formula

30



wherein X, D, R6 and "Ring" are as defined in Table 4

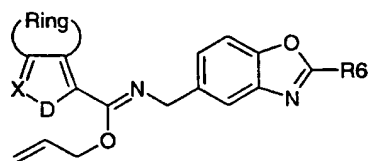
5 Table 109 provides 80 compounds of formula



wherein D, E, W, X and R6 are as defined in Table 3

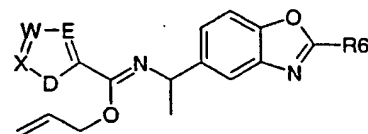
10

Table 110 provides 60 compounds of formula



15 wherein X, D, R6 and "Ring" are as defined in Table 4

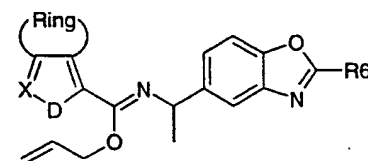
Table 111 provides 80 compounds of formula



20

wherein D, E, W, X and R6 are as defined in Table 3

Table 112 provides 60 compounds of formula

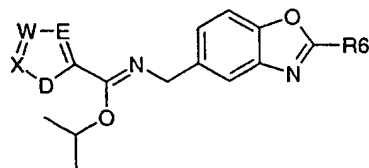


25

wherein X, D, R6 and "Ring" are as defined in Table 4

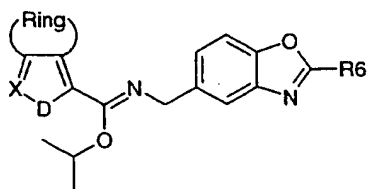
Table 113 provides 80 compounds of formula

30



wherein D, E, W, X and R₆ are as defined in Table 3

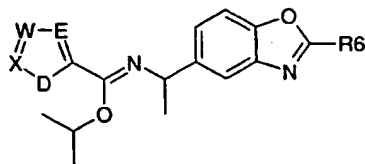
5 Table 114 provides 60 compounds of formula



wherein X, D, R₆ and "Ring" are as defined in Table 4

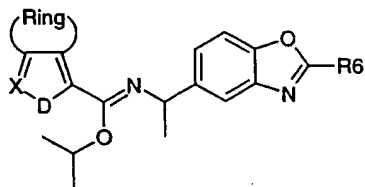
10

Table 115 provides 80 compounds of formula



15 wherein D, E, W, X and R₆ are as defined in Table 3

Table 116 provides 60 compounds of formula



20

wherein X, D, R₆ and "Ring" are as defined in Table 4

The compounds of the invention may be made in a variety of ways. For example the compounds of formula IV i.e. compounds of formula (I) where R⁵¹ is hydrogen and R³, R⁴, R⁵, R⁶, A, B, Z, D, E, W and X are as defined above in relation to formula I may be made by reacting a compound of formula II (where D, E, W and X are as defined in relation to formula (I) and R^a is OH, halogen or OCOalkyl) with a compound of formula III (where R⁵¹ is hydrogen and R³, R⁴, R⁵, R⁶, A, B and Z are as defined in relation to formula (I)).

25

For $R^a = OH$ the reaction is conducted preferably in the presence of a suitable coupling reagent such as 1,3-dicyclohexylcarbodiimide, 1,3-diisopropylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide or 1,1'-carbonyldiimidazole optionally in the presence of a catalyst such as 4-(dimethylamino)pyridine. This coupling reaction may also be conducted with a suitable acid halide ($R^a = \text{halogen}$, especially chlorine), acid anhydride ($R^a = OCOalkyl$) or ester ($R^a = \text{alkoxy}$, substituted alkoxy or aryloxy, especially methoxy) optionally in the presence of a base such as triethylamine or sodium methoxide and in a suitable solvent (such as 1,1,2,2-tetrachloroethane, tetrahydrofuran, N,N-dimethylacetamide or mesitylene)

The acids and esters of formula II and the amines of formula III are known compounds or can be made by known methods. A particularly suitable method for making the amines of formula III (where R^{51} is hydrogen) is by treating an acid of formula V (where R^3, R^4, R^5, R^6, A, B and Z are as defined in relation to formula (I)) with a reagent such as diphenylphosphoryl azide in the presence of a base such as triethylamine in a solvent such as toluene at reflux. Treatment of the isocyanate VI (where R^3, R^4, R^5, R^6, A, B and Z are as defined in relation to formula (I)) (which may or may not be isolated) with an alcohol (such as t-butanol or 2-trimethylsilylethanol) may give the carbamate VII (where R^3, R^4, R^5, R^6, A, B and Z are as defined in relation to formula (I) and R^b is the residue from the alcohol). Conditions for the removal of the carbamate group from intermediate VII depend on the nature of R^b . For example if $R^b = t\text{-butyl}$ then treatment with an acid such as trifluoroacetic acid in a solvent such as tetrahydrofuran may produce amine III ($R^{51} = H$). If however $R^b = 2\text{-trimethylsilylethyl}$ then treatment with tetrabutylammonium fluoride in a solvent such as tetrahydrofuran may produce amine III ($R^{51} = H$).

A particularly suitable method for producing acids of formula II ($R^a = OH$) is to treat an aminoheterocycle of formula VIII (where D, E, W and X are as defined in relation to formula (I) and $R^b = NH_2$) under diazotising conditions (such as t-butyl nitrite in THF or sodium nitrite in sulfuric acid) followed by treatment with copper (I) cyanide which may give the nitrile VIII ($R^b = CN$) which may then be hydrolysed (for example by heating in aqueous sodium hydroxide solution) to give the acid II ($R^a = OH$) upon work-up. Alternatively, acids of formula II ($R^a = OH$) may be formed by treating heterocycles of formula VIII ($R^b = \text{hydrogen or halogen, especially bromine or iodine}$) in a solvent (such as tetrahydrofuran or diethyl ether) with an organometallic species (such as a Grignard reagent or alkyl lithium especially n-butyl lithium) followed by treatment with carbon dioxide. Acids of formula II

(R^a = OH) may be converted into acid halides (R^a = halogen), anhydrides (R^a = C(O)alkyl) and esters (R^a = alkoxy, substituted alkoxy or aryloxy, especially methoxy) using known transformations.

The syntheses of substituted benzimidazoles, benzoxazoles and benzothiazoles are well known (see for example, Alan R. Katritzky and Charles W. Rees, *Comprehensive Heterocyclic Chemistry*, Vol. 6, Pergamon Press, 1984, Helmut M Hugel, *Synth. Commun.*, 15 (12), 1075-1080, (1985), J. Scheigetz, R. Zamboni and B. Roy, *Synth. Commun.*, 25 (18), 2791-2806, (1995), David W. Dunwell, Delme Evans, Terence A. Hicks, *J. Med. Chem.*, 1975, 18, No. 1, 53; Abdou O. Abdelhamid, Cyril Parkanyi, S.M. Khaledur Rashid and Winston D. Lloyd, *J. Heterocyclic Chem.*, 25, 403, (1988); Teruyuki Kondo, Sungbong Yang, Keun-Tae Huh, Masanobu Kobayashi, Shinju Kotachi and Yoshihisa Watanabe, *Chemistry Letters*, 1275, 1991; Dale L. Boger, *J. Org. Chem.*, 43, No 11, 2296, 1978). Benzothiophenes may be made from appropriate thiophenols by processes similar to those described by Robert D Schuetz and Richard L Titus (*J. Heterocycl. Chem.*, 4, No 4, 465 (1967); suitable thiophenols are known compounds or may be prepared by known methods. Benzofurans may be made from *ortho*-halophenols as described by Henning Lutjens and Peter J Scammells, *Tetrahedron Letters* 39 (1998), 6581-6584, Terence C Owen *et al.*, *Tetrahedron Letters* 30, No 13, 1597 (1989) and Fred G Schreiber and Robert Stevenson *J.C.S. Perkin 1*, 90, 1977. Indoles may be made from *ortho*-haloanilines according to the methods of Cheng-yi Chen *et al.*, *J. Org. Chem.* 1997, 62, 2676, Takao Sakamoto *et al.*, *J. Org. Chem.* 1997, 62, 6507 and Alan D. Adams *et al.*, WO9827974. Appropriate *ortho*-substituted phenols and anilines may be prepared by known methods from commercially available 4-hydroxyphenylacetic acid and 4-aminophenylacetic acid.

A compound of formula IX (i.e. a compound of formula I where A, E, W, X, D, B, Z, R⁵¹, R³, R⁴, R⁵ and R⁶ are as defined above in relation to formula I) may be prepared by reacting a compound of formula IV with a suitable thionating agent such as 2,4-bis(4-methoxyphenyl)-1,3-dithia-2,4-diphosphetane-2,4-disulfide (Lawesson's reagent), 2,4-bis(methylthio)-1,3-dithia-2,4-diphosphetane-2,4-disulfide (Davy reagent methyl), 2,4-bis(*para*-tolyl)-1,3-dithia-2,4-diphosphetane-2,4-disulfide (Davy reagent *p*-tolyl) or phosphorus pentasulfide in a suitable solvent such as toluene or fluorobenzene.

Compounds of formula IV (where R⁵¹ is hydrogen) or IX (where R⁵¹ is hydrogen) may be treated with an alkylating agent (such as an alkyl halide, dialkyl sulfate, chloromethylether or trialkyloxonium salt) optionally in the presence of a base to give

additional compounds of formula (IV) or (IX). For compounds of formula IV (where R^{51} is hydrogen), this reaction usually produces compounds IV (where R^{51} = alkyl, alkenylalkyl, alkynylalkyl, cycloalkylalkyl, alkoxyalkyl, alkylcarbonyloxyalkyl). In contrast, for compounds IX, the predominant products are compounds X (where A, E, W, X, D, B, Z, R^{51} , R^3 , R^4 , R^5 and R^6 are as defined above in relation to formula I and R^{53} = alkyl, alkenylalkyl, alkynylalkyl, cycloalkyl, alkoxyalkyl).

Those skilled in the art will recognise that analogous reactions involving sulfenylation, sulfonylation and acylation are possible for compounds IV (R^{51} = H).

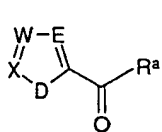
Compounds of formula IV (R^{51} = alkoxyalkyl or acyloxyalkyl) may also be prepared from compounds of formula IV (R^{51} = H) by sequential reaction with formaldehyde and an alkylating or acylating agent.

Compounds of formula X (especially when R^{53} = CH_3) may be reacted with alcohols, hydroxylamines, amines and hydrazines, optionally in the presence of a mercuric salt (such as mercuric chloride), according to known procedures to give compounds of formulae XI and XII respectively (where E, W, X, D, B, Z, R^{51} , R^3 , R^4 , R^5 , R^6 , R^{52} , R^{54} and R^{55} are as defined in relation to formula (I)).

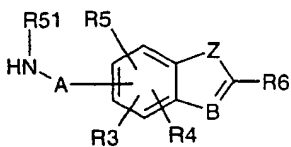
An alternative method for making compounds of formula XIII (i.e. compounds of formula (I) where A, E, W, X, D, M, R^3 , R^4 , R^5 and R^6 are as defined above in relation to formula I) involves the acylation of compounds of formula XIV (where A, E, W, X, D, M, R^3 , R^4 and R^5 are as defined above in relation to formula I) followed by cyclisation, optionally in the presence of an acidic catalyst such as *para*-toluene sulfonic acid in a suitable solvent such as xylene or 1,1,2,2-tetrachloroethane. Compounds of formula XIV may be prepared from compounds of formula XV (where A, E, W, X, D, M, R^3 , R^4 and R^5 are as defined above in relation to formula I) by a sequential procedure of nitration followed by reduction, using known procedures. In turn, compounds of formula XV may be prepared by the dealkylation of compounds of formula XVI (where A, E, W, X, D, M, R^3 , R^4 and R^5 are as defined above in relation to formula I and R is an alkyl group (especially methyl) or substituted alkyl group (especially benzyl)) under standard conditions. Compounds XVI may be prepared from compound II by processes analogous to those already described for compounds IV.

Heteroaryl N-oxides can be produced by known methods.

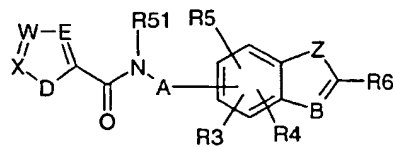
The compounds of formula V, VIII and XVI are known compounds or can be made by known methods.



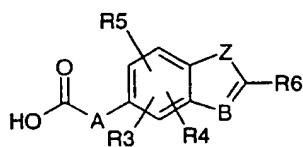
II



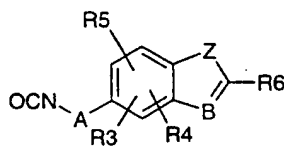
III



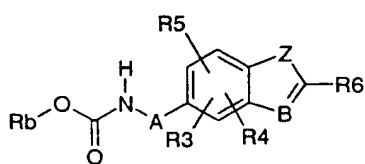
IV



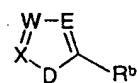
V



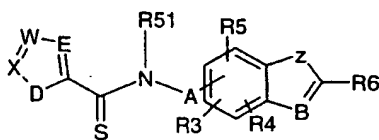
VI



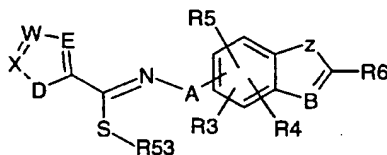
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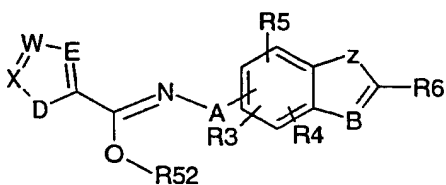
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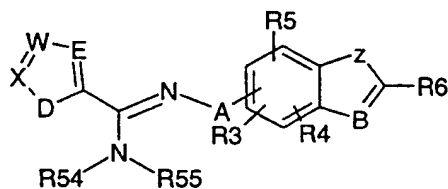
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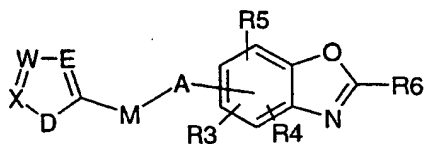
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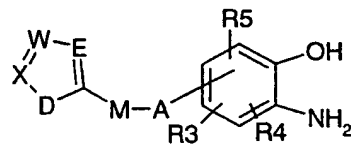
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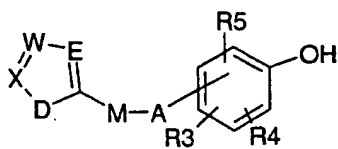
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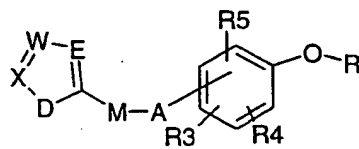
XIII



XIV



XV



XVI

The compounds of formula (I) can be used to combat and control infestations of insect pests such as Lepidoptera, Diptera, Hemiptera, Thysanoptera, Orthoptera, Dictyoptera, Coleoptera, Siphonaptera, Hymenoptera and Isoptera and also other invertebrate pests, for example, acarine, nematode and mollusc pests. Insects, acarines, nematodes and molluscs are hereinafter collectively referred to as pests. The pests which may be combated and controlled by the use of the invention compounds include those pests associated with agriculture (which term includes the growing of crops for food and fibre products), horticulture and animal husbandry, companion animals, forestry and the storage of products of vegetable origin (such as fruit, grain and timber); those pests associated with the damage of man-made structures and the transmission of diseases of man and animals; and also nuisance pests (such as flies).

Examples of pest species which may be controlled by the compounds of formula (I) include: *Myzus persicae* (aphid), *Aphis gossypii* (aphid), *Aphis fabae* (aphid), *Lygus* spp. (capsids), *Dysdercus* spp. (capsids), *Nilaparvata lugens* (planthopper), *Nephotettix inciticeps* (leafhopper), *Nezara* spp. (stinkbugs), *Euschistus* spp. (stinkbugs), *Leptocoris* spp. (stinkbugs), *Frankliniella occidentalis* (thrip), Thrips spp. (thrips), *Leptinotarsa decemlineata* (Colorado potato beetle), *Anthonomus grandis* (boll weevil), *Aonidiella* spp. (scale insects), *Trialeurodes* spp. (white flies), *Bemisia tabaci* (white fly), *Ostrinia nubilalis* (European corn borer), *Spodoptera littoralis* (cotton leafworm), *Heliothis virescens* (tobacco budworm), *Helicoverpa armigera* (cotton bollworm), *Helicoverpa zea* (cotton bollworm), *Sylepta derogata* (cotton leaf roller), *Pieris brassicae* (white butterfly), *Plutella xylostella* (diamond back moth), *Agrotis* spp. (cutworms), *Chilo suppressalis* (rice stem borer), *Locusta migratoria* (locust), *Chortiocetes terminifera* (locust), *Diabrotica* spp. (rootworms), *Panonychus ulmi* (European red mite), *Panonychus citri* (citrus red mite), *Tetranychus urticae* (two-spotted spider mite), *Tetranychus cinnabarinus* (carmine spider mite), *Phyllocoptruta oleivora* (citrus rust mite), *Polyphagotarsonemus latus* (broad mite), *Brevipalpus* spp. (flat mites), *Boophilus microplus* (cattle tick), *Dermacentor variabilis* (American dog tick), *Ctenocephalides felis* (cat flea), *Liriomyza* spp. (leafminer), *Musca domestica* (housefly), *Aedes aegypti* (mosquito), *Anopheles* spp. (mosquitoes), *Culex* spp. (mosquitoes), *Lucillia* spp. (blowflies), *Blattella germanica* (cockroach), *Periplaneta americana* (cockroach), *Blatta orientalis* (cockroach), termites of the Mastotermitidae (for example *Mastotermes* spp.), the Kalotermitidae (for example *Neotermes* spp.), the Rhinotermitidae (for example *Coptotermes formosanus*, *Reticulitermes flavipes*, *R. speratu*,

R. virginicus, *R. hesperus*, and *R. santonensis*) and the Termitidae (for example *Globitermes sulphureus*), *Solenopsis geminata* (fire ant), *Monomorium pharaonis* (pharaoh's ant), *Damalinea* spp. and *Linognathus* spp. (biting and sucking lice), *Meloidogyne* spp. (root knot nematodes), *Globodera* spp. and *Heterodera* spp. (cyst nematodes), *Pratylenchus* spp. (lesion nematodes), *Rhodopholus* spp. (banana burrowing nematodes), *Tylenchulus* spp. (citrus nematodes), *Haemonchus contortus* (barber pole worm), *Caenorhabditis elegans* (vinegar eelworm), *Trichostrongylus* spp. (gastro intestinal nematodes) and *Deroceras reticulatum* (slug).

The compounds of formula (I) are also active fungicides and may be used to control one or more of the following pathogens: *Pyricularia oryzae* (*Magnaporthe grisea*) on rice and wheat and other *Pyricularia* spp. on other hosts; *Puccinia recondita*, *Puccinia striiformis* and other rusts on wheat, *Puccinia hordei*, *Puccinia striiformis* and other rusts on barley, and rusts on other hosts (for example turf, rye, coffee, pears, apples, peanuts, sugar beet, vegetables and ornamental plants); *Erysiphe cichoracearum* on cucurbits (for example melon); *Erysiphe graminis* (powdery mildew) on barley, wheat, rye and turf and other powdery mildews on various hosts, such as *Sphaerotheca macularis* on hops, *Sphaerotheca fusca* (*Sphaerotheca fuliginea*) on cucurbits (for example cucumber), *Leveillula taurica* on tomatoes, aubergine and green pepper, *Podosphaera leucotricha* on apples and *Uncinula necator* on vines; *Cochliobolus* spp., *Helminthosporium* spp., *Drechslera* spp. (*Pyrenophora* spp.), *Rhynchosporium* spp., *Mycosphaerella graminicola* (*Septoria tritici*) and *Phaeosphaeria nodorum* (*Stagonospora nodorum* or *Septoria nodorum*), *Pseudocercospora herpotrichoides* and *Gaeumannomyces graminis* on cereals (for example wheat, barley, rye), turf and other hosts; *Cercospora arachidicola* and *Cercosporidium personatum* on peanuts and other *Cercospora* spp. on other hosts, for example sugar beet, bananas, soya beans and rice; *Botrytis cinerea* (grey mould) on tomatoes, strawberries, vegetables, vines and other hosts and other *Botrytis* spp. on other hosts; *Alternaria* spp. on vegetables (for example carrots), oil-seed rape, apples, tomatoes, potatoes, cereals (for example wheat) and other hosts; *Venturia* spp. (including *Venturia inaequalis* (scab)) on apples, pears, stone fruit, tree nuts and other hosts; *Cladosporium* spp. on a range of hosts including cereals (for example wheat) and tomatoes; *Monilinia* spp. on stone fruit, tree nuts and other hosts; *Didymella* spp. on tomatoes, turf, wheat, cucurbits and other hosts; *Phoma* spp. on oil-seed rape, turf, rice, potatoes, wheat and other hosts; *Aspergillus* spp. and *Aureobasidium* spp. on wheat, lumber and other hosts; *Ascochyta* spp. on peas, wheat, barley

and other hosts; *Stemphylium* spp. (*Pleospora* spp.) on apples, pears, onions and other hosts; summer diseases (for example bitter rot (*Glomerella cingulata*), black rot or frog-eye leaf spot (*Botryosphaeria obtusa*), Brooks fruit spot (*Mycosphaerella pomi*), Cedar apple rust (*Gymnosporangium juniperi-virginianae*), sooty blotch (*Gloeodes pomigena*), flyspeck (*Schizothyrium pomi*) and white rot (*Botryosphaeria dothidea*)) on apples and pears;

5 *Plasmopara viticola* on vines; other downy mildews, such as *Bremia lactucae* on lettuce, *Peronospora* spp. on soybeans, tobacco, onions and other hosts, *Pseudoperonospora humuli* on hops and *Pseudoperonospora cubensis* on cucurbits; *Pythium* spp. (including *Pythium ultimum*) on turf and other hosts; *Phytophthora infestans* on potatoes and tomatoes and other

10 *Phytophthora* spp. on vegetables, strawberries, avocado, pepper, ornamentals, tobacco, cocoa and other hosts; *Thanatephorus cucumeris* on rice and turf and other *Rhizoctonia* spp. on various hosts such as wheat and barley, peanuts, vegetables, cotton and turf; *Sclerotinia* spp. on turf, peanuts, potatoes, oil-seed rape and other hosts; *Sclerotium* spp. on turf, peanuts and other hosts; *Gibberella fujikuroi* on rice; *Colletotrichum* spp. on a range of hosts

15 including turf, coffee and vegetables; *Laetisaria fuciformis* on turf; *Mycosphaerella* spp. on bananas, peanuts, citrus, pecans, papaya and other hosts; *Diaporthe* spp. on citrus, soybean, melon, pears, lupin and other hosts; *Elsinoe* spp. on citrus, vines, olives, pecans, roses and other hosts; *Verticillium* spp. on a range of hosts including hops, potatoes and tomatoes; *Pyrenopeziza* spp. on oil-seed rape and other hosts; *Oncobasidium theobromae* on cocoa

20 causing vascular streak dieback; *Fusarium* spp., *Typhula* spp., *Microdochium nivale*, *Ustilago* spp., *Urocystis* spp., *Tilletia* spp. and *Claviceps purpurea* on a variety of hosts but particularly wheat, barley, turf and maize; *Ramularia* spp. on sugar beet, barley and other hosts; post-harvest diseases particularly of fruit (for example *Penicillium digitatum*, *Penicillium italicum* and *Trichoderma viride* on oranges, *Colletotrichum musae* and

25 *Gloeosporium musarum* on bananas and *Botrytis cinerea* on grapes); other pathogens on vines, notably *Eutypa lata*, *Guignardia bidwellii*, *Phellinus igniarius*, *Phomopsis viticola*, *Pseudopeziza tracheiphila* and *Stereum hirsutum*; other pathogens on trees (for example *Lophodermium seeditiosum*) or lumber, notably *Cephaloscypha fragrans*, *Ceratocystis* spp., *Ophiostoma piceae*, *Penicillium* spp., *Trichoderma pseudokoningii*, *Trichoderma viride*,

30 *Trichoderma harzianum*, *Aspergillus niger*, *Leptographium lindbergii* and *Aureobasidium pullulans*; and fungal vectors of viral diseases (for example *Polymyxa graminis* on cereals as the vector of barley yellow mosaic virus (BYMV) and *Polymyxa betae* on sugar beet as the vector of rhizomania).

A compound of formula (I) may move acropetally, basipetally or locally in plant tissue to be active against one or more fungi. Moreover, a compound of formula (I) may be volatile enough to be active in the vapour phase against one or more fungi on the plant.

The invention therefore provides a method of combating and controlling insects, acarines, nematodes or molluscs which comprises applying an insecticidally, acaricidally, nematocidally or molluscicidally effective amount of a compound of formula (I), or a composition containing a compound of formula (I), to a pest, a locus of pest, or to a plant susceptible to attack by a pest, and a method of combating and controlling fungi which comprises applying a fungicidally effective amount of a compound of formula (I), or a composition containing a compound of formula (I), to a plant, to a seed of a plant, to the locus of the plant or seed, to soil or to any other growth medium (for example a nutrient solution). The compounds of formula (I) are preferably used against insects, acarines, nematodes or fungi.

The term "plant" as used herein includes seedlings, bushes and trees. Furthermore, the fungicidal method of the invention includes protectant, curative, systemic, eradican and antispore treatments.

As fungicides, the compounds of formula (I) are preferably used for agricultural, horticultural and turfgrass purposes in the form of a composition.

In order to apply a compound of formula (I) as an insecticide, acaricide, nematocide or molluscicide to a pest, a locus of pest, or to a plant susceptible to attack by a pest, or, as a fungicide to a plant, to a seed of a plant, to the locus of the plant or seed, to soil or to any other growth medium, a compound of formula (I) is usually formulated into a composition which includes, in addition to the compound of formula (I), a suitable inert diluent or carrier and, optionally, a surface active agent (SFA). SFAs are chemicals which are able to modify the properties of an interface (for example, liquid/solid, liquid/air or liquid/liquid interfaces) by lowering the interfacial tension and thereby leading to changes in other properties (for example dispersion, emulsification and wetting). It is preferred that all compositions (both solid and liquid formulations) comprise, by weight, 0.0001 to 95%, more preferably 1 to 85%, for example 5 to 60%, of a compound of formula (I). The composition is generally used for the control of pests or fungi such that a compound of formula (I) is applied at a rate of from 0.1g to 10kg per hectare, preferably from 1g to 6kg per hectare, more preferably from 1g to 1kg per hectare.

When used in a seed dressing, a compound of formula (I) is used at a rate of 0.0001g to 10g (for example 0.001g or 0.05g), preferably 0.005g to 10g, more preferably 0.005g to 4g, per kilogram of seed.

In another aspect the present invention provides an insecticidal, acaricidal,
5 nematicidal, molluscicidal or fungicidal composition comprising an insecticidally, acaricidally, nematicidally, molluscicidally or fungicidally effective amount of a compound of formula (I) and a suitable carrier or diluent therefor. The composition is preferably an insecticidal, acaricidal, nematicidal or fungicidal composition.

In a still further aspect the invention provides a method of combating and controlling
10 pests or fungi at a locus which comprises treating the pests or fungi or the locus of the pests or fungi with an insecticidally, acaricidally, nematicidally, molluscicidally or fungicidally effective amount of a composition comprising a compound of formula (I). The compounds of formula (I) are preferably used against insects, acarines, nematodes or fungi.

The compositions can be chosen from a number of formulation types, including
15 dustable powders (DP), soluble powders (SP), water soluble granules (SG), water dispersible granules (WG), wettable powders (WP), granules (GR) (slow or fast release), soluble concentrates (SL), oil miscible liquids (OL), ultra low volume liquids (UL), emulsifiable concentrates (EC), dispersible concentrates (DC), emulsions (both oil in water (EW) and water in oil (EO)), micro-emulsions (ME), suspension concentrates (SC), aerosols,
20 fogging/smoke formulations, capsule suspensions (CS) and seed treatment formulations. The formulation type chosen in any instance will depend upon the particular purpose envisaged and the physical, chemical and biological properties of the compound of formula (I).

Dustable powders (DP) may be prepared by mixing a compound of formula (I) with one or more solid diluents (for example natural clays, kaolin, pyrophyllite, bentonite,
25 alumina, montmorillonite, kieselguhr, chalk, diatomaceous earths, calcium phosphates, calcium and magnesium carbonates, sulphur, lime, flours, talc and other organic and inorganic solid carriers) and mechanically grinding the mixture to a fine powder.

Soluble powders (SP) may be prepared by mixing a compound of formula (I) with one or more water-soluble inorganic salts (such as sodium bicarbonate, sodium carbonate or
30 magnesium sulphate) or one or more water-soluble organic solids (such as a polysaccharide) and, optionally, one or more wetting agents, one or more dispersing agents or a mixture of said agents to improve water dispersibility/solubility. The mixture is then ground to a fine powder. Similar compositions may also be granulated to form water soluble granules (SG).

Wettable powders (WP) may be prepared by mixing a compound of formula (I) with one or more solid diluents or carriers, one or more wetting agents and, preferably, one or more dispersing agents and, optionally, one or more suspending agents to facilitate the dispersion in liquids. The mixture is then ground to a fine powder. Similar compositions
5 may also be granulated to form water dispersible granules (WG).

Granules (GR) may be formed either by granulating a mixture of a compound of formula (I) and one or more powdered solid diluents or carriers, or from pre-formed blank granules by absorbing a compound of formula (I) (or a solution thereof, in a suitable agent) in a porous granular material (such as pumice, attapulgite clays, fuller's earth, kieselguhr,
10 diatomaceous earths or ground corn cobs) or by adsorbing a compound of formula (I) (or a solution thereof, in a suitable agent) on to a hard core material (such as sands, silicates, mineral carbonates, sulphates or phosphates) and drying if necessary. Agents which are commonly used to aid absorption or adsorption include solvents (such as aliphatic and aromatic petroleum solvents, alcohols, ethers, ketones and esters) and sticking agents (such
15 as polyvinyl acetates, polyvinyl alcohols, dextrans, sugars and vegetable oils). One or more other additives may also be included in granules (for example an emulsifying agent, wetting agent or dispersing agent).

Dispersible Concentrates (DC) may be prepared by dissolving a compound of formula (I) in water or an organic solvent, such as a ketone, alcohol or glycol ether. These
20 solutions may contain a surface active agent (for example to improve water dilution or prevent crystallisation in a spray tank).

Emulsifiable concentrates (EC) or oil-in-water emulsions (EW) may be prepared by dissolving a compound of formula (I) in an organic solvent (optionally containing one or more wetting agents, one or more emulsifying agents or a mixture of said agents). Suitable
25 organic solvents for use in ECs include aromatic hydrocarbons (such as alkylbenzenes or alkylnaphthalenes, exemplified by SOLVESSO 100, SOLVESSO 150 and SOLVESSO 200; SOLVESSO is a Registered Trade Mark), ketones (such as cyclohexanone or methylcyclohexanone) and alcohols (such as benzyl alcohol, furfuryl alcohol or butanol), N-alkylpyrrolidones (such as N-methylpyrrolidone or N-octylpyrrolidone), dimethyl amides
30 of fatty acids (such as C₈-C₁₀ fatty acid dimethylamide) and chlorinated hydrocarbons. An EC product may spontaneously emulsify on addition to water, to produce an emulsion with sufficient stability to allow spray application through appropriate equipment. Preparation of an EW involves obtaining a compound of formula (I) either as a liquid (if it is not a liquid at

room temperature, it may be melted at a reasonable temperature, typically below 70°C) or in solution (by dissolving it in an appropriate solvent) and then emulsifying the resultant liquid or solution into water containing one or more SFAs, under high shear, to produce an emulsion. Suitable solvents for use in EWs include vegetable oils, chlorinated hydrocarbons (such as chlorobenzenes), aromatic solvents (such as alkylbenzenes or alkylnaphthalenes) and other appropriate organic solvents which have a low solubility in water.

Microemulsions (ME) may be prepared by mixing water with a blend of one or more solvents with one or more SFAs, to produce spontaneously a thermodynamically stable isotropic liquid formulation. A compound of formula (I) is present initially in either the water or the solvent/SFA blend. Suitable solvents for use in MEs include those hereinbefore described for use in ECs or in EWs. An ME may be either an oil-in-water or a water-in-oil system (which system is present may be determined by conductivity measurements) and may be suitable for mixing water-soluble and oil-soluble pesticides in the same formulation. An ME is suitable for dilution into water, either remaining as a microemulsion or forming a conventional oil-in-water emulsion.

Suspension concentrates (SC) may comprise aqueous or non-aqueous suspensions of finely divided insoluble solid particles of a compound of formula (I). SCs may be prepared by ball or bead milling the solid compound of formula (I) in a suitable medium, optionally with one or more dispersing agents, to produce a fine particle suspension of the compound. One or more wetting agents may be included in the composition and a suspending agent may be included to reduce the rate at which the particles settle. Alternatively, a compound of formula (I) may be dry milled and added to water, containing agents hereinbefore described, to produce the desired end product.

Aerosol formulations comprise a compound of formula (I) and a suitable propellant (for example *n*-butane). A compound of formula (I) may also be dissolved or dispersed in a suitable medium (for example water or a water miscible liquid, such as *n*-propanol) to provide compositions for use in non-pressurised, hand-actuated spray pumps.

A compound of formula (I) may be mixed in the dry state with a pyrotechnic mixture to form a composition suitable for generating, in an enclosed space, a smoke containing the compound.

Capsule suspensions (CS) may be prepared in a manner similar to the preparation of EW formulations but with an additional polymerisation stage such that an aqueous dispersion of oil droplets is obtained, in which each oil droplet is encapsulated by a polymeric shell and

contains a compound of formula (I) and, optionally, a carrier or diluent therefor. The polymeric shell may be produced by either an interfacial polycondensation reaction or by a coacervation procedure. The compositions may provide for controlled release of the compound of formula (I) and they may be used for seed treatment. A compound of formula (I) may also be formulated in a biodegradable polymeric matrix to provide a slow, controlled release of the compound.

A composition may include one or more additives to improve the biological performance of the composition (for example by improving wetting, retention or distribution on surfaces; resistance to rain on treated surfaces; or uptake or mobility of a compound of formula (I)). Such additives include surface active agents, spray additives based on oils, for example certain mineral oils or natural plant oils (such as soy bean and rape seed oil), and blends of these with other bio-enhancing adjuvants (ingredients which may aid or modify the action of a compound of formula (I)).

A compound of formula (I) may also be formulated for use as a seed treatment, for example as a powder composition, including a powder for dry seed treatment (DS), a water soluble powder (SS) or a water dispersible powder for slurry treatment (WS), or as a liquid composition, including a flowable concentrate (FS), a solution (LS) or a capsule suspension (CS). The preparations of DS, SS, WS, FS and LS compositions are very similar to those of, respectively, DP, SP, WP, SC and DC compositions described above. Compositions for treating seed may include an agent for assisting the adhesion of the composition to the seed (for example a mineral oil or a film-forming barrier).

Wetting agents, dispersing agents and emulsifying agents may be surface SFAs of the cationic, anionic, amphoteric or non-ionic type.

Suitable SFAs of the cationic type include quaternary ammonium compounds (for example cetyltrimethyl ammonium bromide), imidazolines and amine salts.

Suitable anionic SFAs include alkali metals salts of fatty acids, salts of aliphatic monoesters of sulphuric acid (for example sodium lauryl sulphate), salts of sulphonated aromatic compounds (for example sodium dodecylbenzenesulphonate, calcium dodecylbenzenesulphonate, butylnaphthalene sulphonate and mixtures of sodium di-*isopropyl*- and tri-*isopropyl*-naphthalene sulphonates), ether sulphates, alcohol ether sulphates (for example sodium laureth-3-sulphate), ether carboxylates (for example sodium laureth-3-carboxylate), phosphate esters (products from the reaction between one or more fatty alcohols and phosphoric acid (predominately mono-esters) or phosphorus pentoxide

(predominately di-esters), for example the reaction between lauryl alcohol and tetraphosphoric acid; additionally these products may be ethoxylated), sulphosuccinamates, paraffin or olefine sulphonates, taurates and lignosulphonates.

Suitable SFAs of the amphoteric type include betaines, propionates and glycines.

5 Suitable SFAs of the non-ionic type include condensation products of alkylene oxides, such as ethylene oxide, propylene oxide, butylene oxide or mixtures thereof, with fatty alcohols (such as oleyl alcohol or cetyl alcohol) or with alkylphenols (such as octylphenol, nonylphenol or octylcresol); partial esters derived from long chain fatty acids or hexitol anhydrides; condensation products of said partial esters with ethylene oxide; block
10 polymers (comprising ethylene oxide and propylene oxide); alkanolamides; simple esters (for example fatty acid polyethylene glycol esters); amine oxides (for example lauryl dimethyl amine oxide); and lecithins.

 Suitable suspending agents include hydrophilic colloids (such as polysaccharides, polyvinylpyrrolidone or sodium carboxymethylcellulose) and swelling clays (such as
15 bentonite or attapulgite).

 A compound of formula (I) may be applied by any of the known means of applying pesticidal or fungicidal compounds. For example, it may be applied, formulated or unformulated, to the pests or to a locus of the pests (such as a habitat of the pests, or a growing plant liable to infestation by the pests) or to any part of the plant, including the
20 foliage, stems, branches or roots, to the seed before it is planted or to other media in which plants are growing or are to be planted (such as soil surrounding the roots, the soil generally, paddy water or hydroponic culture systems), directly or it may be sprayed on, dusted on, applied by dipping, applied as a cream or paste formulation, applied as a vapour or applied through distribution or incorporation of a composition (such as a granular composition or a
25 composition packed in a water-soluble bag) in soil or an aqueous environment.

 A compound of formula (I) may also be injected into plants or sprayed onto vegetation using electrodynamic spraying techniques or other low volume methods, or applied by land or aerial irrigation systems.

 Compositions for use as aqueous preparations (aqueous solutions or dispersions) are
30 generally supplied in the form of a concentrate containing a high proportion of the active ingredient, the concentrate being added to water before use. These concentrates, which may include DCs, SCs, ECs, EWs, MEs SGs, SPs, WPs, WGs and CSs, are often required to withstand storage for prolonged periods and, after such storage, to be capable of addition to

water to form aqueous preparations which remain homogeneous for a sufficient time to enable them to be applied by conventional spray equipment. Such aqueous preparations may contain varying amounts of a compound of formula (I) (for example 0.0001 to 10%, by weight) depending upon the purpose for which they are to be used.

5 A compound of formula (I) may be used in mixtures with fertilisers (for example nitrogen-, potassium- or phosphorus-containing fertilisers). Suitable formulation types include granules of fertiliser. The mixtures suitably contain up to 25% by weight of the compound of formula (I).

10 The invention therefore also provides a fertiliser composition comprising a fertiliser and a compound of formula (I).

 The compositions of this invention may contain other compounds having biological activity, for example micronutrients or compounds having similar or complementary fungicidal activity or which possess plant growth regulating, herbicidal, insecticidal, nematocidal or acaricidal activity.

15 By including another fungicide, the resulting composition may have a broader spectrum of activity or a greater level of intrinsic activity than the compound of formula (I) alone. Further the other fungicide may have a synergistic effect on the fungicidal activity of the compound of formula (I).

 The compound of formula (I) may be the sole active ingredient of the composition or
20 it may be admixed with one or more additional active ingredients such as a pesticide, fungicide, synergist, herbicide or plant growth regulator where appropriate. An additional active ingredient may: provide a composition having a broader spectrum of activity or increased persistence at a locus; synergise the activity or complement the activity (for example by increasing the speed of effect or overcoming repellency) of the compound of
25 formula (I); or help to overcome or prevent the development of resistance to individual components. The particular additional active ingredient will depend upon the intended utility of the composition. Examples of suitable pesticides include the following:

a) Pyrethroids, such as permethrin, cypermethrin, fenvalerate, esfenvalerate, deltamethrin, cyhalothrin (in particular lambda-cyhalothrin), bifenthrin, fenpropathrin, cyfluthrin,
30 tefluthrin, fish safe pyrethroids (for example ethofenprox), natural pyrethrin, tetramethrin, s-bioallethrin, fenfluthrin, prallethrin or 5-benzyl-3-furylmethyl-(E)-(1R,3S)-2,2-dimethyl-3-(2-oxothiolan-3-ylidenemethyl)cyclopropane carboxylate;

- b) Organophosphates, such as, profenofos, sulprofos, acephate, methyl parathion, azinphos-methyl, demeton-s-methyl, heptenophos, thiometon, fenamiphos, monocrotophos, profenofos, triazophos, methamidophos, dimethoate, phosphamidon, malathion, chlorpyrifos, phosalone, terbufos, fensulfothion, fonofos, phorate, phoxim, pirimiphos-methyl, 5 pirimiphos-ethyl, fenitrothion, fosthiazate or diazinon;
- c) Carbamates (including aryl carbamates), such as pirimicarb, triazamate, cloethocarb, carbofuran, furathiocarb, ethiofencarb, aldicarb, thiofurox, carbosulfan, bendiocarb, fenobucarb, propoxur, methomyl or oxamyl;
- d) Benzoyl ureas, such as diflubenzuron, triflumuron, hexaflumuron, flufenoxuron or 10 chlorfluazuron;
- e) Organic tin compounds, such as cyhexatin, fenbutatin oxide or azocyclotin;
- f) Pyrazoles, such as tebufenpyrad and fenpyroximate;
- g) Macrolides, such as avermectins or milbemycins, for example abamectin, emamectin benzoate, ivermectin, milbemycin, spinosad or azadirachtin;
- 15 h) Hormones or pheromones;
- i) Organochlorine compounds such as endosulfan, benzene hexachloride, DDT, chlordane or dieldrin;
- j) Amidines, such as chlordimeform or amitraz;
- k) Fumigant agents, such as chloropicrin, dichloropropane, methyl bromide or metam;
- 20 l) Chloronicotinyl compounds such as imidacloprid, thiacloprid, acetamiprid, nitenpyram or thiamethoxam;
- m) Diacylhydrazines, such as tebufenozide, chromafenozide or methoxyfenozide;
- n) Diphenyl ethers, such as diofenolan or pyriproxifen;
- o) Indoxacarb;
- 25 p) Chlorfenapyr; or
- q) Pymetrozine.

In addition to the major chemical classes of pesticide listed above, other pesticides having particular targets may be employed in the composition, if appropriate for the intended utility of the composition. For instance, selective insecticides for particular crops, for 30 example stemborer specific insecticides (such as cartap) or hopper specific insecticides (such as buprofezin) for use in rice may be employed. Alternatively insecticides or acaricides specific for particular insect species/stages may also be included in the compositions (for example acaricidal ovo-larvicides, such as clofentezine, flubenzimine, hexythiazox or

tetradifon; acaricidal motilicides, such as dicofol or propargite; acaricides, such as bromopropylate or chlorobenzilate; or growth regulators, such as hydramethylnon, cyromazine, methoprene, chlorfluazuron or diflubenzuron).

Examples of fungicidal compounds which may be included in the composition of the invention are (E)-N-methyl-2-[2-(2,5-dimethylphenoxy)methyl]phenyl]-2-methoxy-iminoacetamide (SSF-129), 4-bromo-2-cyano-N,N-dimethyl-6-trifluoromethylbenzimidazole-1-sulphonamide, α -[N-(3-chloro-2,6-xylyl)-2-methoxyacetamido]- γ -butyrolactone, 4-chloro-2-cyano-N,N-dimethyl-5-p-tolylimidazole-1-sulfonamide (IKF-916, cyamidazosulfamid), 3-5-dichloro-N-(3-chloro-1-ethyl-1-methyl-2-oxopropyl)-4-methylbenzamide (RH-7281, zoxamide), N-allyl-4,5,-dimethyl-2-trimethylsilylthiophene-3-carboxamide (MON65500), N-(1-cyano-1,2-dimethylpropyl)-2-(2,4-dichlorophenoxy)propionamide (AC382042), N-(2-methoxy-5-pyridyl)-cyclopropane carboxamide, acibenzolar (CGA245704), alanycarb, aldimorph, anilazine, azaconazole, azoxystrobin, benalaxyl, benomyl, biloxazol, bitertanol, blasticidin S, bromuconazole, bupirimate, captafol, captan, carbendazim, carbendazim chlorhydrate, carboxin, carpropamid, carvone, CGA41396, CGA41397, chinomethionate, chlorothalonil, chlorozolate, clozylacon, copper containing compounds such as copper oxychloride, copper oxyquinolate, copper sulphate, copper tallate and Bordeaux mixture, cymoxanil, cyproconazole, cyprodinil, debacarb, di-2-pyridyl disulphide 1,1'-dioxide, dichlofluanid, diclomezine, dicloran, diethofencarb, difenoconazole, difenzoquat, diflumetorim, O,O-di-iso-propyl-S-benzyl thiophosphate, dimefluazole, dimetconazole, dimethomorph, dimethirimol, diniconazole, dinocap, dithianon, dodecyl dimethyl ammonium chloride, dodemorph, dodine, doguadine, edifenphos, epoxiconazole, ethirimol, ethyl(Z)-N-benzyl-N-([methyl(methyl-thioethylideneaminooxycarbonyl)amino]thio)- β -alaninate, etridiazole, famoxadone, fenamidone (RPA407213), fenarimol, fenbuconazole, fenfuram, fenhexamid (KBR2738), fenciclonil, fenpropidin, fenpropimorph, fentin acetate, fentin hydroxide, ferbam, ferimzone, fluazinam, fludioxonil, flumetover, fluoroimide, fluquinconazole, flusilazole, flutolanil, flutriafol, folpet, fuberidazole, furalaxyl, furametpyr, guazatine, hexaconazole, hydroxyisoxazole, hymexazole, imazalil, imibenconazole, iminoctadine, iminoctadine triacetate, ipconazole, iprobenfos, iprodione, iprovalicarb (SZX0722), isopropanyl butyl carbamate, isoprothiolane, kasugamycin, kresoxim-methyl, LY186054, LY211795, LY248908, mancozeb, maneb, mefenoxam, mepanipyrim, mepronil, metalaxyl, metconazole, metiram, metiram-zinc, metominostrobin, myclobutanil, neoasozin, nickel dimethyldithiocarbamate, nitrothal-isopropyl, nuarimol, ofurace, organomercury

compounds, oxadixyl, oxasulfuron, oxolinic acid, oxpoconazole, oxycarboxin, pefurazoate, penconazole, pencycuron, phenazin oxide, phosetyl-Al, phosphorus acids, phthalide, picoxystrobin (ZA1963), polyoxin D, polyram, probenazole, prochloraz, procymidone, propamocarb, propiconazole, propineb, propionic acid, pyrazophos, pyrifenox, pyrimethanil, pyroquilon, pyroxyfur, pyrrolnitrin, quaternary ammonium compounds, quinomethionate, quinoxifen, quintozone, sipconazole (F-155), sodium pentachlorophenate, spiroxamine, streptomycin, sulphur, tebuconazole, tecloftalam, tecnazene, tetraconazole, thiabendazole, thifluzamid, 2-(thiocyanomethylthio)benzothiazole, thiophanate-methyl, thiram, timibenconazole, tolclofos-methyl, tolylfluanid, triadimefon, triadimenol, triazbutil, triazoxide, tricyclazole, tridemorph, trifloxystrobin (CGA279202), triforine, triflumizole, triticonazole, validamycin A, vapam, vinclozolin, zineb and ziram.

The compounds of formula (I) may be mixed with soil, peat or other rooting media for the protection of plants against seed-borne, soil-borne or foliar fungal diseases.

Examples of suitable synergists for use in the compositions include piperonyl butoxide, sesamex, safroxan and dodecyl imidazole.

Suitable herbicides and plant-growth regulators for inclusion in the compositions will depend upon the intended target and the effect required.

An example of a rice selective herbicide which may be included is propanil. An example of a plant growth regulator for use in cotton is PIX™.

Some mixtures may comprise active ingredients which have significantly different physical, chemical or biological properties such that they do not easily lend themselves to the same conventional formulation type. In these circumstances other formulation types may be prepared. For example, where one active ingredient is a water insoluble solid and the other a water insoluble liquid, it may nevertheless be possible to disperse each active ingredient in the same continuous aqueous phase by dispersing the solid active ingredient as a suspension (using a preparation analogous to that of an SC) but dispersing the liquid active ingredient as an emulsion (using a preparation analogous to that of an EW). The resultant composition is a suspoemulsion (SE) formulation.

The invention is illustrated by the following Examples,

EXAMPLE 1

This Example describes the preparation of compound No 97 in Table I

Step 1

(2-(2,2-Dimethylpropyl)benzoxazol-5-yl)acetic acid (5.0 g, 20.24 mmol) was suspended in toluene (100 ml) and triethylamine (3.1 ml, 22.24 mmol) was added. The mixture was heated to reflux and a solution of diphenylphosphoryl azide (4.58 ml, 21.25 mmol) in toluene (40 ml) was added dropwise. The mixture was heated at reflux for 2 hours after which it was allowed to cool and 2-trimethylsilylethanol (6.8 ml, 47.44 mmol) was added. The resulting mixture was then heated at reflux for 3 hours. The mixture was allowed to cool and the solvent was evaporated under reduced pressure. The residue was purified by flash chromatography on silica gel eluting with ethyl acetate to give N-(2-trimethylsilylethoxycarbonyl)-1-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)methylamine (5.86 g, 80%).

¹H NMR (CDCl₃) δ ppm: 0.03 (s,9H); 1.00 (br t,2H); 1.09 (s,9H); 2.81 (s,2H); 4.19 (br t,2H); 4.44 (d,2H); 5.11 (br s,1H); 7.24 (dd,1H); 7.44 (d,1H); 7.59 (d,1H)

Step 2

N-(2-Trimethylsilylethoxycarbonyl)-1-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)methylamine (5.85 g, 16.2 mmol) was suspended in THF (50 ml) and tetrabutylammonium fluoride (1.0 M in THF, 25 ml, 25 mmol) was added. The mixture was heated to reflux for 30 min. after which it was allowed to cool. The mixture was evaporated and the residue was purified by flash chromatography on silica gel using 0.1% triethylamine, 5% methanol in dichloromethane to give (2-(2,2-dimethylpropyl)benzoxazol-5-yl)methylamine (2.85 g, 81%).

¹H NMR (CDCl₃) δ ppm: 1.09 (s,9H); 1.62 (br s,2H); 2.82 (s,2H); 3.98 (s,2H); 7.27 (dd,1H); 7.45 (d,1H); 7.63 (d,1H)

Step 3

1,2-Dimethyl-[1H]-imidazole-5-carboxylic acid (77 mg, 0.55 mmol) was dissolved in THF (5 ml) and (2-(2,2-dimethylpropyl)benzoxazol-5-yl)methylamine (109 mg, 0.5 mmol) was added, followed by 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (106 mg, 0.55 mmol) and 4-dimethylaminopyridine (catalytic amount). The suspension was warmed to 60°C for 2 hours. The mixture was allowed to cool and was partitioned between water and ethyl acetate. The aqueous layer was extracted with ethyl acetate (2 x 30 ml) and the combined organic layers were dried (MgSO₄), filtered and evaporated. The residue was purified by chromatography on silica gel eluting with 10% methanol in dichloromethane to give Compound 97 of Table 1 (96 mg, 56%).

¹H NMR (CDCl₃) δ ppm: 1.06 (s,9H); 2.36 (s,3H); 2.79 (s,2H); 3.82 (s,3H); 4.62 (d,2H); 7.16 (t,1H); 7.27 (dd,1H); 7.37 (s,1H); 7.42 (d,1H); 7.60 (d,1H)

EXAMPLE 2

This Example describes the preparation of compound No 17 in Table 2

- 5 2,4,5,6-Tetrahydro-2,6-dimethyl-3-cyclopentapyrazolecarboxylic acid (0.18 g, 1.0 mmol) was suspended in THF (5 ml) and cooled to 0°C. 4-Methylmorpholine (0.13 ml, 1.2 mmol) and isobutylchloroformate (0.14 ml, 1.05 mmol) were added and the mixture was allowed to stir for 45 minutes. (2-(2,2-Dimethylpropyl)benzoxazol-5-yl)methylamine (0.22 g, 1.0 mmol) and more 4-methylmorpholine (0.13 ml, 1.2 mmol) were dissolved in THF (5 ml) and added
- 10 to the reaction mixture. The mixture was left to stir for 30 minutes. The mixture was partitioned between water and ethyl acetate. The organic layer was washed with brine, dried (MgSO₄), filtered and evaporated. The residue was purified by flash chromatography on silica gel eluting with ethyl acetate to give the Compound 17 of Table 2 as an oil (0.14 g, 37%).
- 15 ¹H NMR (CDCl₃) δ ppm: 1.10 (s,9H); 1.29 (d,3H); 2.01 (m,1H); 2.65 (m,3H); 2.82 (s,2H); 3.14 (m,1H); 4.18 (s,3H); 4.69 (m,2H); 6.10 (br t,1H); 7.30 (dd,1H); 7.46 (d,1H); 7.63 (d,1H)

EXAMPLE 3

This Example describes the preparation of compound No 87 in Table I

20 Step 1

5-Methyl-1,3,4-oxathiazol-2-one (5.3 g, 61 mmol) was dissolved in mesitylene (100 ml). Methyl cyanoformate (12.5 g, 150 mmol) was added and the mixture was heated to reflux for 7 hours. The reaction mixture was concentrated under reduced pressure to give an approximately 10% solution of methyl 3-methyl-1,2,4-thiadiazole-5-carboxylate in

25 mesitylene which was used without further purification.

¹H NMR (CDCl₃) δ ppm: 2.80 (s,3H); 4.05 (s,3H)

Step 2

- Methyl 3-methyl-1,2,4-thiadiazole-5-carboxylate (10% solution in mesitylene, 2 ml, approximately 200 mg, 1.2 mmol), toluene (1 ml) and (2-(2,2-dimethylpropyl)benzoxazol-5-yl)methylamine (0.30 g, 1.38 mmol) were added to a Wheaton vial and heated at 150°C for 1
- 30 hour. The solvents were evaporated under reduced pressure and the residue was purified by preparative thin layer chromatography eluting with 30% ethyl acetate in hexane to Compound 87 of Table 1 (0.21 g, 51%).

¹H NMR (CDCl₃) δ ppm: 1.10 (s,9H); 2.65 (s,3H); 2.85 (s,2H); 4.75 (d,2H); 7.30 (dd,1H); 7.50 (d,1H); 7.55 (br s,1H); 7.65 (d,1H)

EXAMPLE 4

This Example describes the preparation of compound No 7 in Table I

5 4-Chloro-3-ethyl-1-methyl-[1H]-pyrazole-5-carboxylic acid (93 mg, 0.50 mmol) was dissolved in dichloromethane (2 ml) and dicyclohexylcarbodiimide (0.08 ml, 0.50 mmol) in dichloromethane (1 ml) was added. (2-(2,2-Dimethylpropyl)benzoxazol-5-yl)methylamine (108 mg, 0.50 mmol) in dichloromethane (1 ml) was added dropwise, followed by 4-dimethylaminopyridine (catalytic quantity). The mixture was stirred at room temperature for
10 90 minutes. The reaction mixture was partitioned between water and dichloromethane, and the aqueous layer was extracted with dichloromethane (3 x 20 ml). The combined organic layers were washed with brine, dried (MgSO₄), filtered and evaporated. The residue was purified by chromatography on silica gel eluting with ethyl acetate (10-25% gradient elution) in hexane to give Compound 7 in Table 1 (109 mg, 57%).

15 ¹H NMR (CDCl₃) δ ppm: 1.10 (s,9H); 1.25 (t,3H); 2.55 (q,2H); 2.80 (s,2H); 4.15 (s,3H); 4.70 (d,2H); 7.10 (br s,1H); 7.30 (dd,1H); 7.50 (d,1H); 7.70 (d,1H)

A useful branched chain amine intermediate may be prepared by the following method.

Preparative Example A

20 Preparation of 1-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)ethylamine.

Step 1

Methyl (2-(2,2-dimethylpropyl)benzoxazol-5-yl)acetate (14.85 g, 57.0 mmol) was dissolved in THF (200 ml) and the solution was cooled to -75°C. Lithium bis-trimethylsilylamide (1.0 M in THF, 62.7 ml, 62.7 mmol) was added dropwise over 90
25 minutes so that the temperature never exceeded -70°C. The mixture was then allowed to stir for 1 hour at -75°C and methyl iodide (63 ml, 570 mmol) was added dropwise. The mixture was allowed to warm to room temperature overnight. The mixture was partitioned between water and ethyl acetate and the organic solution was washed with brine, dried (MgSO₄), filtered and evaporated to give methyl 2-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)propionate
30 which was used without further purification.

¹H NMR (CDCl₃) δ ppm: 1.10 (s,9H); 1.55 (d,3H); 2.82 (s,2H); 4.68 (s,3H); 4.85 (q,1H); 7.23 (dd,1H); 7.43 (d,1H); 7.62 (d,1H)

Step 2

Methyl 2-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)propionate (2.92 g, 10.6 mmol) was dissolved in methanol (25 ml) and aqueous sodium hydroxide (1.0 M, 11 ml, 11 mmol) was added dropwise and the mixture was stirred at room temperature for 45 minutes. Brine (100 ml) and aqueous hydrochloric acid (2.0 M, 10 ml) were added and the mixture was
5 extracted with ethyl acetate which was dried (MgSO_4), filtered and evaporated to give 2-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)propionic acid as a yellow oil which crystallised on standing (2.63 g, 95%).

^1H NMR (CDCl_3) δ ppm: 1.11 (s, 9H); 1.58 (d, 3H); 2.82 (s, 2H); 3.88 (q, 1H); 7.26 (dd, 1H); 7.43 (d, 1H); 7.69 (d, 1H)

10 Step 3

2-(2-(2,2-Dimethylpropyl)benzoxazol-5-yl)propionic acid (2.63 g, 10 mmol) was suspended in toluene (20 ml) and triethylamine (1.70 ml, 12 mmol) was added. The mixture was heated to reflux and a solution of diphenylphosphoryl azide (2.4 ml, 11 mmol) in toluene (5 ml) was added dropwise. The mixture was heated at reflux for 90 min after which it was
15 allowed to cool and 2-trimethylsilylethanol (1.75 ml, 12 mmol) was added. The resulting mixture was then heated at reflux for 3 hours. The mixture was allowed to cool and then diluted with toluene (100 ml) and washed with water (5 x 100 ml) and brine (100 ml). The organic layer was dried (MgSO_4), filtered and under reduced pressure. The residue was purified by flash chromatography on silica gel eluting with 15% ethyl acetate in hexane to
20 give N-(2-trimethylsilylethoxycarbonyl)-1-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)ethylamine (2.65 g, 72%).

^1H NMR (CDCl_3) δ ppm: 0.01 (s, 9H); 0.95 (t, 2H); 1.08 (s, 9H); 1.50 (d, 3H); 2.81 (s, 2H); 4.13 (t, 2H); 4.35 (m, 1H); 4.95 (m, 1H); 7.25 (dd, 1H); 7.44 (d, 1H); 7.63 (d, 1H)

Step 4

25 N-(2-Trimethylsilylethoxycarbonyl)-1-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)ethylamine (2.65 g, 7.1 mmol) was suspended in THF (25 ml) and tetrabutylammonium fluoride (1.0 M in THF, 10.0 ml, 10.0 mmol) was added. The mixture was heated to reflux for 30 minutes after which it was allowed to cool. The solvent was evaporated under reduced pressure and the residue was partitioned between water and ether. The organic layer was
30 washed with brine, dried (MgSO_4) filtered and evaporated under reduced pressure to give 1-(2-(2,2-dimethylpropyl)benzoxazol-5-yl)ethylamine which was used with no further purification (1.36 g, 83%).

¹H NMR (CDCl₃) δ ppm: 1.09 (s,9H); 1.44 (d,3H); 1.80 (br s,2H); 2.82 (s,2H); 4.25 (q,1H); 7.31 (dd,1H); 7.44 (d,1H); 7.67 (d,1H)

The following compounds were synthesised by routes analogous to those described in Example 4 above.

5 Compound 1 in Table 1

¹H NMR (CDCl₃) δ ppm: 1.25 (t,3H); 2.65 (s,3H); 2.65 (q,2H); 4.15 (s,3H); 4.75 (d,2H); 7.10 (br s,1H); 7.33 (dd,1H); 7.45 (d,1H); 7.65 (d,1H)

Compound 3 in Table 1

¹H NMR (CDCl₃) δ ppm: 1.10 (t,3H); 1.25 (t,3H); 1.95 (m,2H); 2.65 (q,2H); 2.90 (t,2H); 4.15 (s,3H); 4.75 (d,2H); 7.10 (br s,1H); 7.30 (d,1H); 7.45 (d,1H); 7.65 (s,1H)

The following compounds were synthesised by routes analogous to those described in Example 1 above.

Compound 11 in Table 4

¹H NMR (CDCl₃) δ ppm: 1.29 (dd,3H); 1.62 (d,3H); 2.04 (m,1H); 2.64 (s,3H); 3.15 (m,1H); 4.13 (s,3H); 5.33 (p,1H); 5.98 (d,1H); 7.30 (dt,1H); 7.44 (d,1H); 7.61 (s,1H)

Compound 11 in Table 2

¹H NMR (CDCl₃) δ ppm: 1.28 (d,3H); 1.99 (m, 2H); 2.64 (s,3H); 2.66 (m, 3H); 3.12 (m,1H); 4.18 (s,3H); 4.70 (m,2H); 6.10 (t,1H); 7.28 (dd,1H); 7.44 (d,1H); 7.60 (d,1H)

Compound 17 in Table 4

¹H NMR (CDCl₃) δ ppm: 1.09 (s,9H); 1.62 (d,3H); 2.05 (m,1H); 2.74 (m,3H); 2.83 (s,2H); 3.16 (m,1H); 4.14 (s,3H); 5.34 (p,1H); 6.00 (d,1H); 7.32 (dt,1H); 7.48 (d,1H); 7.67 (s,1H)

Compound 17 in Table 1

¹H NMR (CDCl₃) δ ppm: 1.08 (s,9H); 1.24 (t,3H); 2.63 (q,2H); 2.82 (s,2H); 3.79 (s,3H); 4.12 (s,3H); 4.69 (d,2H); 7.29 (dd,1H); 7.44 (d,1H); 7.59 (br t,1H); 7.63 (d,1H).

25 EXAMPLE 5

This Example illustrates the pesticidal/insecticidal properties of compounds of formula (I). The activities of individual compounds of formula (I) were determined using a variety of pests. The pests were treated with a liquid composition containing 500 parts per million (ppm) by weight of a compound. Each composition was made by dissolving the compound in an acetone and ethanol (50:50 by volume) mixture and diluting the solution with water containing 0.05% by volume of a wetting agent, SYNPERONIC NP8, until the liquid composition contained the required concentration of the compound.

The test procedure adopted with regard to each pest was essentially the same and comprised supporting a number of the pests on a medium which was usually a substrate, a host plant or a foodstuff on which the pests feed, and treating either or both the medium and the pests with a composition. Pest mortality was assessed usually between two and five days after treatment.

The results of the tests against peach aphid (*Myzus persicae*) are presented below. In this test Chinese cabbage leaves were infested with aphids, the infested leaves were sprayed with the test composition, and the mortality assessed after three days. The results indicate a grading of mortality (score) designated as 9, 5 or 0 wherein 9 indicates 80-100% mortality, 5 indicates 40-79% mortality and 0 indicates less than 40% mortality.

Compound No. 7 of Table 1, compound No. 11 of Table 2, compound No. 17 of Table 4 and compound Nos. 17 of Table 2, each gave a mortality score of 9 whilst compound No. 1 of Table 1, compound No.87 of Table 1, compound No.67 of Table 2, compound No. 117 of Table 1 and compound No.137 of Table 1, gave a score of 5.

In addition, in a similar test against two-spotted spider mites (*Tetranychus urticae*) Compound Nos.7 of Table 1, compound No. 17 of Table 2, compound No. 117 of Table 1 and compound No.137 of Table 1, gave a score of 9 whilst compound No. 87 of Table 1 gave a score of 5.

EXAMPLE 6

This Example illustrates the fungicidal properties of compounds of formula (I). The compounds were tested against a variety of foliar fungal diseases of plants. The technique employed was as follows.

Plants were grown in John Innes Potting Compost (No.1 or 2) in 4cm diameter, 3.5cm depth minipots. The test compounds were individually formulated as a solution either in acetone or acetone/ethanol (1:1 by volume) which was diluted in deionised water to a concentration of 100ppm (that is, 1mg of compound in a final volume of 10ml) immediately before use. When foliar sprays were applied to monocotyledonous crops, TWEEN 20 (0.1% by volume) was added. TWEEN is a registered trade mark.

Individual compounds of formula (I) were applied as a foliar (Folr) application (where the chemical solution was applied to the foliage of the test plants by spraying the plant to maximum droplet retention.)

These tests were carried out against *Uncinula necator* (UNCINE), on vines; *Phytophthora infestans lycopersici* (PHYTIN) on tomatoes; *Puccinia recondita* (PUCCRT),

on wheat; and *Pyricularia oryzae* (PYRIOR) on rice. Each treatment was applied to two or more replicate plants for *Phytophthora infestans lycopersici* and *Ucinula necator*. For tests on *Puccinia recondita* and *Pyricularia oryzae* two replicate pots each containing 6 to 10 plants were used for each treatment. The plants were inoculated one day before (Erad) or one day after (Prot) chemical application. The *Phytophthora infestans lycopersici*, *Puccinia recondita* and *Pyricularia oryzae* plants were inoculated with a calibrated fungal spore suspension. The *Ucinula necator* plants were inoculated using a 'blowing' inoculation technique.

After chemical application and inoculation, the plants were incubated under high humidity conditions and then put into an appropriate environment to allow infection to proceed, until the disease was ready for assessment. The time period between chemical application and assessment varied from five to fourteen days according to the disease and environment. However, each individual disease was assessed after the same time period for all compounds.

Assessments were performed on each of two leaves on each of the replicate plants for *Phytophthora infestans lycopersici*. Assessments were performed on a single leaf of each of the replicate plants for *Ucinula necator*. For *Puccinia recondita* and *Pyricularia recondita* assessments were carried out collectively on the plants in each replicate pot.

The disease level present (that is, the percentage leaf area covered by actively sporulating disease) was assessed visually. For each treatment, the assessed values for all its replicates were meaned to provide mean disease values. Untreated control plants were assessed in the same manner. The data were then processed by the method, described hereinafter, to provide PRCO (Percentage Reduction from Control) values.

An example of a typical calculation is as follows:

an disease level for treatment A = 25%

Mean disease level on untreated controls = 85%

$$\text{PRCO} = 100 - \left\{ \frac{\text{Mean disease level for treatment A}}{\text{Mean disease level on untreated controls}} \right\} \times 100$$

$$= 100 - \left(\frac{25}{85} \times 100 \right) = 70.6$$

The PRCO is then rounded to the nearest whole number; therefore, in this particular example, the PRCO result is 71.

It is possible for negative PRCO values to be obtained. If no test data were available this is indicated in the Table below by a "-".

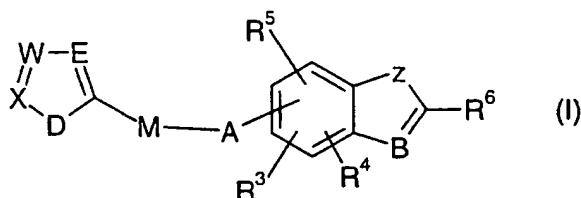
5 PRCO results are shown below.

TABLE 117

COMPOUND NO.	PHYTIN Prot	PUCCRT Prot	PYRIOR Prot	UNCINE Erad
7 of Table 1	99	-	53	100
1 of Table 1	-	99	-	78
87 of Table 1	53	0	0	73
3 of Table 1	-	100	99	100
97 of Table 1	0	21	44	41
11 of Table 2	90	100	60	80
17 of Table 4	68	100	40	98
17 of Table 2	-	100	61	100

CLAIMS

1. A compound of formula (I):



wherein

A is optionally substituted C₁₋₆ alkylene, optionally substituted C₂₋₆ alkenylene, optionally substituted C₂₋₆ alkynylene, optionally substituted cycloalkylene, optionally substituted C₁₋₆ alkyleneoxy, optionally substituted oxy(C₁₋₆)alkylene, optionally substituted C₁₋₆ alkylenethio, optionally substituted thio(C₁₋₆)alkylene, optionally substituted C₁₋₆ alkyleneamino, optionally substituted amino(C₁₋₆)alkylene, optionally substituted [C₁₋₆ alkyleneoxy(C₁₋₆)alkylene], optionally substituted [C₁₋₆ alkylenethio(C₁₋₆)alkylene], optionally substituted [C₁₋₆ alkylenesulfinyl(C₁₋₆)alkylene], optionally substituted [C₁₋₆ alkylenesulfonyl(C₁₋₆)alkylene] or optionally substituted [C₁₋₆ alkyleneamino(C₁₋₆)alkylene];

B is N, N-oxide or CR¹⁸;

D is O, S, NR⁷, CR⁸=CR⁹, CR⁸=N, N=CR⁹, CR⁸=N(O) or N(O)=CR⁹;

E is N, N-oxide or CR¹²;

W is CR¹ or N;

X is N, N-oxide or CR¹¹ and R¹¹ is hydrogen, optionally substituted C₁₋₆ alkyl or optionally substituted phenyl, with the proviso that the ring containing D, E, X and

W contains at least one atom that is other than a carbon atom and the ring containing D, E, W and X may contain no more than 3 heteroatoms;

M is N(R⁵¹)C(=Y), N=C(OR⁵²), N=C(SR⁵³) or N=C(NR⁵⁴R⁵⁵) where N is the atom of attachment to the group "A";

Y is O, S or NR¹³;

Z is O, S or NR¹⁴;

R¹ is hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₃₋₇ cycloalkyl, cyano, nitro or SF₅;

R⁷ is hydrogen or optionally substituted C₁₋₆ alkyl;

R⁵¹ is hydrogen, optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, optionally substituted phenoxycarbonyl, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, optionally substituted C₁₋₆ arylthio, optionally substituted C₁₋₆ arylsulfinyl, optionally substituted C₁₋₆ arylsulfonyl or R²⁰R²¹NS(O)_p where p is 0, 1 or 2, especially 0;

R⁵² is optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, amino, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, optionally substituted phenoxycarbonyl, tri(C₁₋₄)alkylsilyl, aryldi(C₁₋₄)alkylsilyl, (C₁₋₄)alkyldiarylsilyl or triarylsilyl; R⁵³ is optionally substituted C₁₋₁₀ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl or optionally substituted phenoxycarbonyl); R⁵⁴ and R⁵⁵ are, independently optionally substituted C₁₋₁₀ alkyl, optionally substituted C₁₋₆ alkoxy, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₁₋₁₀ alkylcarbonyl, optionally substituted C₁₋₁₀ alkoxycarbonyl, formyl, optionally substituted C₁₋₁₀ alkylaminocarbonyl, optionally substituted di(C₁₋₁₀)alkylaminocarbonyl, hydroxy, amino, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, or optionally substituted phenoxycarbonyl; R³, R⁴ and R⁵ are, independently, hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, cyano, nitro, optionally substituted C₁₋₆ alkylcarbonyl, optionally

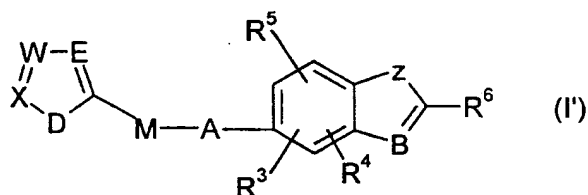
substituted C₁₋₆ alkoxy carbonyl or SF₅; R⁶ is hydrogen, halogen, cyano, optionally substituted C₁₋₂₀ alkyl, optionally substituted C₂₋₂₀ alkenyl, optionally substituted C₂₋₂₀ alkynyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted C₅₋₆ cycloalkenyl, formyl, optionally substituted C₁₋₂₀ alkoxy carbonyl, optionally substituted C₁₋₂₀ alkyl carbonyl, aminocarbonyl, optionally substituted C₁₋₂₀ alkyl aminocarbonyl, optionally substituted di(C₁₋₂₀)alkyl aminocarbonyl, optionally substituted aryloxy carbonyl, optionally substituted aryl carbonyl, optionally substituted aryl aminocarbonyl, optionally substituted N-alkyl-N-aryl aminocarbonyl, optionally substituted diaryl aminocarbonyl, optionally substituted heteroaryloxy carbonyl, optionally substituted heteroaryl carbonyl, optionally substituted heteroaryl aminocarbonyl, optionally substituted N-alkyl-N-heteroaryl aminocarbonyl, optionally substituted diheteroaryl aminocarbonyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted heterocyclyl, HS, optionally substituted C₁₋₂₀ alkylthio, optionally substituted C₁₋₂₀ alkylsulfinyl, optionally substituted C₁₋₂₀ alkylsulfonyl, optionally substituted arylthio, optionally substituted arylsulfinyl, optionally substituted arylsulfonyl, R²⁶O, R²⁸R²⁹N or R³¹ON=C(R²⁷); R⁸ and R⁹ are, independently, hydrogen, halogen, cyano, nitro, optionally substituted C₁₋₆ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl or optionally substituted C₁₋₆ alkoxy; R¹² is hydrogen, halogen, optionally substituted C₁₋₆ alkyl, optionally substituted C₂₋₆ alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆ alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆ alkylsulfonyl, cyano, nitro, formyl, optionally substituted C₁₋₆ alkyl carbonyl, optionally substituted C₁₋₆ alkoxy carbonyl, SF₅, R³²ON=C(R³⁰), or R¹ and R¹² together with the atoms to which they are attached may be joined to form a five, six or seven-membered saturated or unsaturated, carbocyclic or heterocyclic ring which may contain one or two heteroatoms selected from O, N or S and which may be optionally substituted by C₁₋₆ alkyl, C₁₋₆ haloalkyl or halogen; R¹³ is hydrogen, cyano, nitro, optionally substituted C₁₋₆ alkyl, optionally substituted C₃₋₇ cycloalkyl, optionally substituted (C₂₋₆)alkenyl(C₁₋₆)alkyl, optionally substituted (C₂₋₆)alkynyl-(C₁₋₆)alkyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally substituted C₁₋₆ alkyl carbonyl, optionally substituted C₁₋₆ alkoxy carbonyl, optionally substituted C₁₋₆ alkylamino, optionally substituted di(C₁₋₆)alkylamino, optionally

substituted C₁₋₆ alkylcarbonylamino, optionally substituted C₁₋₆
alkoxycarbonylamino, optionally substituted C₁₋₆ alkoxy, optionally substituted C₁₋₆
alkylthio, optionally substituted C₁₋₆ alkylsulfinyl, optionally substituted C₁₋₆
alkylsulfonyl, optionally substituted arylthio, optionally substituted arylsulfinyl,
5 optionally substituted arylsulfonyl or C₁₋₆ alkylcarbonyloxy; R¹⁴ is hydrogen, cyano,
optionally substituted C₁₋₈ alkyl, optionally substituted [C₂₋₆ alkenyl(C₁₋₆)alkyl],
optionally substituted [C₂₋₆ alkynyl(C₁₋₆)alkyl], optionally substituted C₃₋₇ cycloalkyl,
optionally substituted [C₃₋₇ cycloalkyl(C₁₋₆)alkyl], C₁₋₆ alkoxy(C₁₋₆)alkyl, optionally
substituted C₁₋₆ alkoxycarbonyl, optionally substituted C₁₋₆ alkylcarbonyl, optionally
10 substituted C₁₋₆ alkylaminocarbonyl, optionally substituted di(C₁₋₆)alkylamino-
carbonyl, optionally substituted phenyl, optionally substituted heteroaryl, optionally
substituted alkylsulfonyl or optionally substituted arylsulfonyl; R¹⁸ is hydrogen,
halogen, nitro, cyano, optionally substituted C₁₋₈ alkyl, optionally substituted C₂₋₆
alkenyl, optionally substituted C₂₋₆ alkynyl, optionally substituted C₃₋₇ cycloalkyl,
15 optionally substituted C₁₋₆ alkoxycarbonyl, optionally substituted C₁₋₆ alkylcarbonyl,
optionally substituted C₁₋₆ alkylaminocarbonyl, optionally substituted di(C₁₋₆)
alkylaminocarbonyl, optionally substituted phenyl or optionally substituted
heteroaryl; R²⁰ and R²¹ are, independently, optionally substituted C₁₋₆ alkyl or R²⁰ and
R²¹ together with the N atom to which they are attached form a five, six or seven-
20 membered heterocyclic ring which may contain one or two further hetero atoms
selected from O, N or S and which may be optionally substituted by one or two C₁₋₆
alkyl groups; R²⁶ is hydrogen, optionally substituted C₁₋₂₀ alkyl, optionally substituted
[C₂₋₂₀ alkenyl(C₁₋₆)alkyl], optionally substituted [C₂₋₂₀ alkynyl(C₁₋₆)alkyl], optionally
substituted C₃₋₇ cycloalkyl, optionally substituted aryl, optionally substituted
25 heteroaryl, optionally substituted [heterocycl(C₁₋₆)alkylCH=N] or di(C₁₋₆)alkylC=N;
R²⁸ and R²⁹ are, independently, hydrogen, optionally substituted C₁₋₂₀ alkyl,
optionally substituted C₃₋₇ cycloalkyl, optionally substituted [C₂₋₂₀ alkenyl(C₁₋₆)alkyl],
optionally substituted [C₂₋₂₀ alkynyl(C₁₋₆)alkyl], optionally substituted C₁₋₂₀
alkoxycarbonyl, optionally substituted phenoxy carbonyl, formyl, optionally
30 substituted C₁₋₂₀ alkylcarbonyl, optionally substituted C₁₋₂₀ alkylsulfonyl or optionally
substituted phenylsulfonyl; or R²⁸ and R²⁹ together with the N atom to which they are
attached form a five, six or seven-membered heterocyclic ring which may contain one
or two further hetero atoms selected from O, N or S and which may be optionally

- 84 -

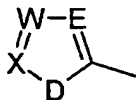
substituted by one or two C₁₋₆ alkyl groups; R²⁷ and R³⁰ are independently hydrogen, optionally substituted phenyl or optionally substituted C₁₋₆ alkyl; and R³¹ and R³² are, independently, hydrogen, optionally substituted phenyl (C₁₋₂)alkyl or optionally substituted C₁₋₂₀ alkyl provided that when A is CH₂, M is CONH, D is S, and X is N then E and W cannot both be C-Cl.

2. A compound according to claim 1 which is a compound of formula I'



where A, B, D, E, M, W, X, Z, R³, R⁴, R⁵, and R⁶ have the values as defined for formula (I) in claim 1.

3. A compound according to claim 1 or claim 2 wherein M is C(O)NR⁵¹ where the N atom is attached to the group "A".
4. A compound according to any preceding claim wherein A is C₁₋₆ alkylene (optionally substituted by halogen, C₁₋₃ alkyl, C₁₋₃ haloalkyl, C₁₋₃ cyanoalkyl, C₁₋₆ alkoxy, -C(O)- or C₁₋₆ alkyleneoxy).
5. A compound according to any preceding claim wherein Z is O or S and B is N.
6. A compound according to any preceding claim wherein the optionally substituted ring of formula



is a pyrazoles, a 2,4,5,6-tetrahydro-cyclopentapyrazole, a 4,5,6,7-tetrahydro-[2H]-indazole or an indazole which may be optionally substituted by substituents chosen from halo, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy, C₁₋₆ alkoxy(C₁₋₆)alkyl or C₁₋₆ haloalkoxy.

7. A compound according to any preceding claim wherein R^6 is C_{1-8} alkyl, C_{1-6} haloalkyl, C_{1-6} cyanoalkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{3-7} halocycloalkyl, C_{3-7} cyanocycloalkyl, C_{1-3} alkyl(C_{3-7})cycloalkyl, C_{1-3} alkyl(C_{3-7})halocycloalkyl, C_{5-6} cycloalkenyl, C_{3-7} cycloalkyl(C_{1-6})alkyl, C_{5-6} cycloalkenyl(C_{1-6})alkyl, C_{2-6} haloalkenyl, C_{1-6} cyanoalkenyl, C_{1-6} alkoxy(C_{1-6})alkyl, C_{3-6} alkenyloxy(C_{1-6})alkyl, C_{3-6} alkynyloxy(C_{1-6})alkyl, aryloxy(C_{1-6})alkyl, C_{1-6} carboxyalkyl, C_{1-6} alkylcarbonyl(C_{1-6})alkyl, C_{2-6} alkenylcarbonyl(C_{1-6})alkyl, C_{2-6} alkynylcarbonyl(C_{1-6})alkyl, C_{1-6} alkoxycarbonyl(C_{1-6})alkyl, C_{3-6} alkenyloxycarbonyl(C_{1-6})alkyl, C_{3-6} alkynyloxycarbonyl(C_{1-6})alkyl, aryloxycarbonyl(C_{1-6})alkyl, C_{1-6} alkylthio(C_{1-6})alkyl, C_{1-6} alkylsulfinyl(C_{1-6})alkyl, C_{1-6} alkylsulfonyl(C_{1-6})alkyl, aminocarbonyl(C_{1-6})alkyl, aminocarbonyl(C_{2-6})alkenyl, aminocarbonyl(C_{2-6})alkynyl, C_{1-6} alkylaminocarbonyl(C_{1-6})alkyl, di(C_{1-6})alkylamino-carbonyl(C_{1-6})alkyl, C_{1-6} alkylaminocarbonyl(C_{1-6})alkenyl, di(C_{1-6})alkylamino-carbonyl(C_{1-6})alkenyl, alkylaminocarbonyl(C_{1-6})alkynyl, di(C_{1-6})alkylamino-carbonyl(C_{1-6})alkynyl, phenyl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), phenyl(C_{1-4})alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), phenyl(C_{2-4})alkenyl, (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), heteroaryl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), heterocyclyl (wherein the heterocyclyl group is optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), heteroaryl(C_{1-4})alkyl (wherein the heteroaryl group is optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), heterocyclyl(C_{1-4})alkyl (wherein the heterocyclyl group is optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy), $R^{26}O$, C_{1-8} alkylthio, $R^{28}R^{29}N$ or $R^{31}ON=C(R^{27})$; where R^{26} is C_{1-8} alkyl, C_{1-6} haloalkyl; R^{27} is C_{1-6} alkyl, C_{1-6} haloalkyl or phenyl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy); R^{27} is C_{1-6} alkyl, C_{1-6} haloalkyl or phenyl (optionally substituted by halo, nitro, cyano, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy or C_{1-6} haloalkoxy); R^{28} and R^{29} are, independently, hydrogen, C_{1-8} alkyl, C_{3-7} cycloalkyl, C_{3-6} alkenyl, C_{3-6} alkynyl, C_{3-7} cycloalkyl-

(C₁₋₄)alkyl, C₂₋₆ haloalkyl, C₁₋₆ alkoxy(C₁₋₆)alkyl, C₁₋₆ alkoxycarbonyl, or R²⁸ and R²⁹ together with the N atom to which they are attached form a five, six or seven-membered heterocyclic ring which may contain one or two further hetero atoms selected from O, N or S and which may be optionally substituted by one or two C₁₋₆ alkyl groups; and R³¹ is C₁₋₆ alkyl or phenyl(C₁₋₂)alkyl (wherein the phenyl group is optionally substituted by halo, nitro, cyano, C₁₋₆ alkyl, C₁₋₆ haloalkyl, C₁₋₆ alkoxy or C₁₋₆ haloalkoxy).

8. A fungicidal, insecticidal, acaricidal, molluscicidal or nematocidal composition comprising a fungicidally, insecticidally, acaricidally, molluscicidally or nematocidally effective amount of a compound of formula (I) as claimed in claim 1 and a carrier or diluent therefor.
9. A method of combating and controlling fungi comprising applying to a plant, to a seed of a plant, to the locus of the plant or seed or to the soil a fungicidally effective amount of a compound of formula (I) as claimed in claim 1.
10. A method of combating and controlling insects, acarines, nematodes or molluscs which comprises applying to a pest, to a locus of a pest, or to a plant susceptible to attack by a pest an insecticidally, acaricidally, nematocidally or molluscicidally effective amount of a compound of formula (I) as claimed in claim 1.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 01/00314

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07D413/12 C07D417/12 A01N43/76 A01N43/82

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 00 06566 A (ZENECA) 10 February 2000 (2000-02-10) claims; examples	1-10
Y	US 5 972 843 A (HEIL ET. AL.) 26 October 1999 (1999-10-26) claims; examples	1-10
A	DE 198 25 379 A (BAYER) 9 December 1999 (1999-12-09) claims; examples	1-10
A	US 4 675 331 A (KUME ET. AL.) 23 June 1987 (1987-06-23) claims; examples	1-10
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

12 April 2001

Date of mailing of the international search report

03 May 2001 (03.05.01)

Name and mailing address of the ISA

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Authorized officer

Helps, I

INTERNATIONAL SEARCH REPORT

Intern. Application No

PCT/GB 01/00314

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 236 923 A (KIRSTEN ET. AL.) 17 August 1993 (1993-08-17) claims; examples</p>	1-10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 01/00314

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-10 (part)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 1-10 (part)

The formula of claim 1 is so broad, including vague definitions such as "optionally substituted alkyl" and "heteroaryl", etc. in the definitions of the groups, that it was not possible to carry out a complete search within a reasonable time limit. The search has been carried out limited to the scope covered by the prepare examples (see Guidelienes, B-III, 3.7).

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/00314

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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